# PCI Express Board User's Manual

**Multiport Serial Board for PCI Express Bus**

**Third Edition, July 2008**

***www.moxa.com/product***

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# PCI Express Board User's Manual

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# 1

# Introduction

Moxa's PCI Express serial boards meet the new slot standard for expansion boards, and work with any PCI Express slots. The boards have multiple RS-232/422/485 serial ports for connecting data acquisition equipment and other serial devices to a PC.

This chapter covers the following topics:

- **Overview**
- **Applications**
- **Features**
- **Package Checklist**
- **Installation Flowchart**

# Overview

Moxa's new PCI Express Multiport Serial Boards, named CP-118EL, CP-168EL, and CP-104EL, are designed for POS and ATM applications and for use by industrial automation system manufacturers and system integrators. The boards are compatible with all popular operating systems, and each of them supports data rates of up to 921.6 Kbps, and provides full modem control signals, ensuring compatibility with a wide range of serial peripherals. In addition, CP-118EL, CP-168EL, and CP-104EL work with PCI Express ×1, allowing the boards to be installed in any available PCI Express slot (including ×1, ×2, ×4, ×8, ×16, ×32).

## PCI Express Solution

The boards comply with PCI Express Spec. 1.1. The serial transmission mode (RS-232, RS-422, 2-wire RS-485, or 4-wire RS-485) for each port is set with onboard switches (CP-118EL has DIP Switches, CP-168EL and CP-104EL are RS-232 only), but the ports' transmission parameters are configured after the boards are installed. The PCI BIOS automatically assigns the IRQ and I/O addresses. For this reason, you must plug the boards into the computer before installing the drivers. For more PCI Express information, refer to the "Technical Reference" appendix.

## ESD Protection

The PCI Express boards come with built-in 15 KV ESD protection to prevent damage to the boards from lightning or high potential voltage. The surge protection feature makes the PCI Express boards suitable for industrial, factory-type applications, and for use with applications that are subject to severe weather conditions.

## ADDC™ (Automatic Data Direction Control) for RS-485

To make 2-wire RS-485 half-duplex connections easier to manage, ADDC™ (Automatic Data Direction Control) intelligence is built into the CP-118EL board, eliminating the need for software interference. Windows applications can be set up to manage RS-485 ports without writing additional code to control the half-duplex protocol.

## Operating System Support

The PCI Express boards are compatible with all major industrial platforms, including Windows 2000/XP/2003, DOS, and Linux. Moxa device drivers are provided for smoother installation, configuration, and performance. In this manual, we provide installation details for Windows 2003/XP, Windows 2000, DOS, Linux, and SCO.

Visit Moxa's website at www.moxa.com to download the latest drivers and user's manuals for all of Moxa's products.

## Moxa Serial Comm Tool

For application development, Moxa provides an easy-to-use serial communication library called PComm that runs under Windows NT/95/98/2000/XP/2003. Use this library to develop your own applications with Visual Basic, Visual C++, Borland Delphi, etc. Utilities, such as Data Scope, Monitor, Terminal Emulator, and Diagnostics are included to make it easier to debug, monitor communication status, provide terminal emulation, and transfer files.

# Applications

The PCI Express boards are suitable for many different applications, including:

- Internet/Intranet Connections
- Remote Access
- Multi-user Applications
- Industrial Automation
- Office Automation
- Telecommunications
- PC-based Vending Machines and Kiosks
- POS (Point-of-Sale) Systems

# Features

The PCI Express boards have the following outstanding features:

- PCI Express ×1 compliant
- Low profile board for compact-sized PCs
- Data flow LED display onboard
- Moxa UART with 128-byte FIFO driver
- 50 bps to 921.6 Kbps transmission speed
- Supports both 4-wire and 2-wire RS-485 (CP-118EL,CP-132EL Series,CP-114EL Series)
- 2-wire RS-485 data control with ADDC™ (CP-118EL,CP-132EL Series,CP-114EL Series)
- Embedded 15 KV ESD surge protection
- Drivers for all major industrial platforms—Windows 2000, Windows XP/2003/Vista/2008 (32-bit/64-bit), DOS, Linux (32-bit/64-bit), SCO, FreeBSD 4.x/5.x

# Package Checklist

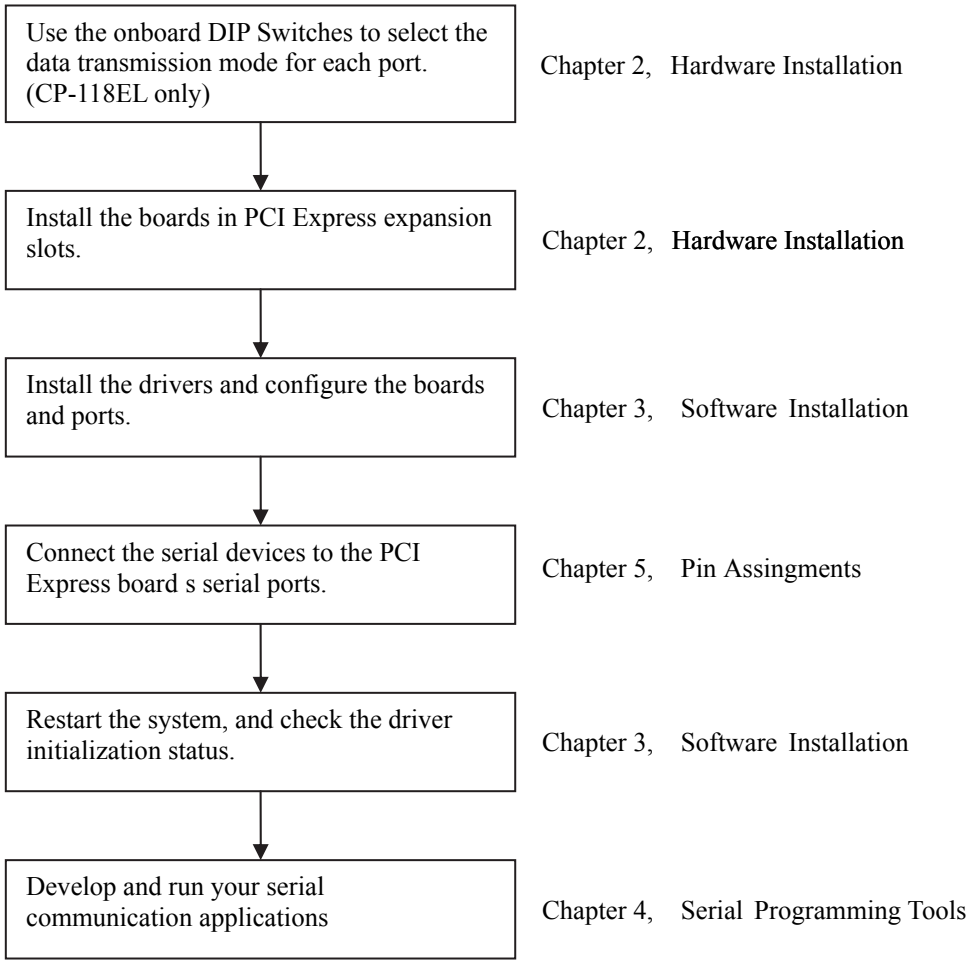
The following items are included in the PCI Express board package:

- PCI Express serial board
- Document and Software CD-ROM
- Quick Installation Guide
- Low profile bracket

NOTE: *Notify your sales representative if any of the above items are missing or damaged.*

# Installation Flowchart

The following flowchart provides a brief summary of the procedure you should follow to install the PCI Express boards and also provides references to chapters with more detailed information:


Use the onboard DIP Switches to select the data transmission mode for each port. (CP-118EL only)
Chapter 2, Hardware Installation
Install the boards in PCI Express expansion slots.
Chapter 2, Hardware Installation
Install the drivers and configure the boards and ports.
Chapter 3, Software Installation
Connect the serial devices to the PCI Express board s serial ports.
Chapter 5, Pin Assingments
Restart the system, and check the driver initialization status.
Chapter 3, Software Installation
Develop and run your serial communication applications
Chapter 4, Serial Programming Tools

# 2

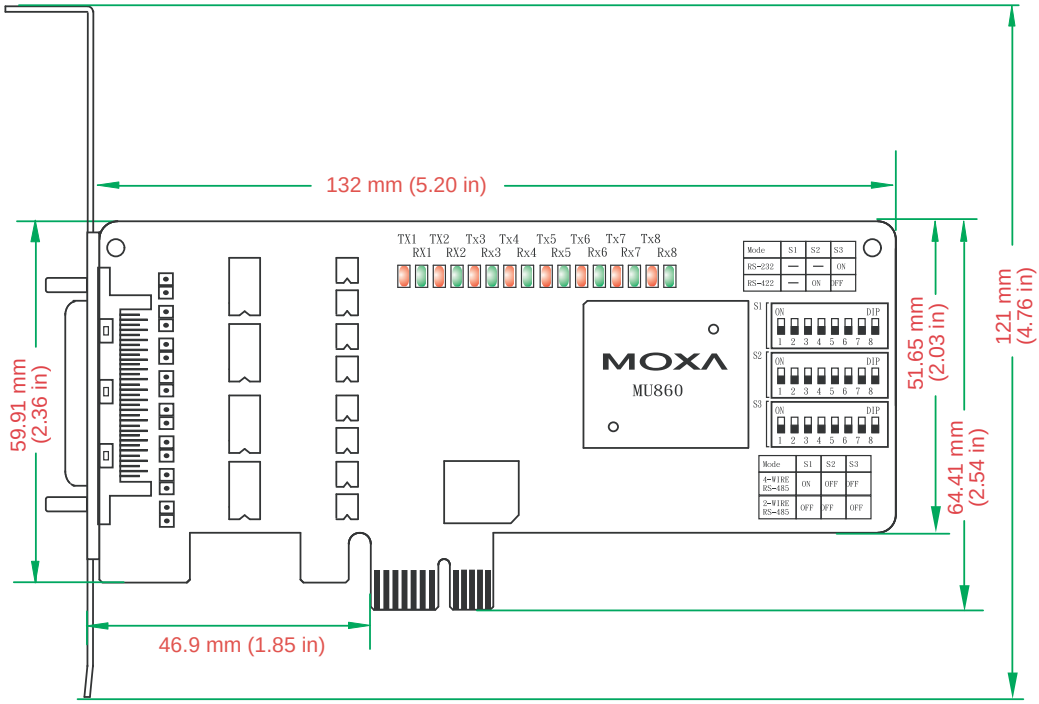
# Hardware Installation

This chapter describes the PCI Express Series hardware installation procedure. Since the BIOS automatically assigns the PCI Express board's IRQ number and I/O addresses, you must plug in the board before installing the driver.

This chapter covers the following topics:

- **CP-118EL Dimensions**
- **DIP Switch Settings (CP-118EL only)**
- **CP-168EL Dimensions (Unit= mm)**
- **CP-104EL Dimensions (Unit= mm)**
- **CP-102E Dimensions (Unit: mm)**
- **CP-102EL Dimensions (Unit: mm)**
- **CP-132EL Dimensions (Unit: mm)**
- **CP-132EL-I Dimensions (Unit: mm)**
- **CP-114EL Dimensions (Unit: mm)**
- **CP-114EL-I Dimensions (Unit: mm)**
- **Plugging the Board into an Expansion Slot**

# CP-118EL Dimensions



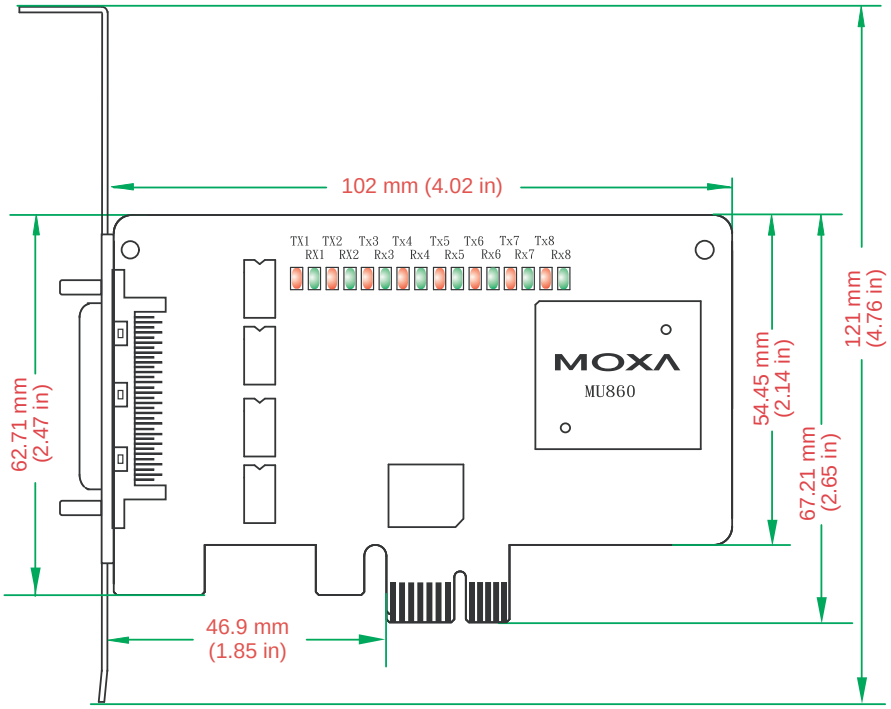

NOTE: Use JP1/2/3/4/5/6/7/8 to activate the Termination Resistors for ports 1/2/3/4/5/6/7/8.
**Open** Termination Resistor is NOT active
**Short** Termination Resistor is ACTIVE

# DIP Switch Settings (CP-118EL only)

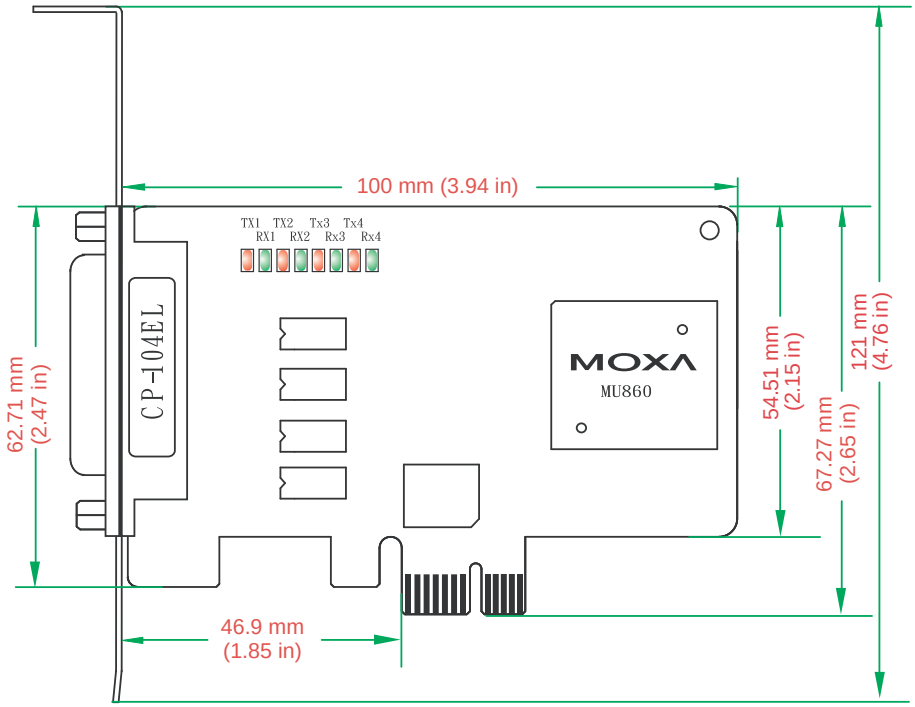
CP-118EL has three onboard DIP Switch arrays, each with 8 switches, shown in the table below and on the listed board (see the above block diagram) as S1, S2, and S3. The switches are used to select one of four serial interfaces—RS-232, RS-422, 4-wire RS-485, 2-wire RS-485—for each of the eight ports. Note that S3 selects between RS-232 and RS-422/485, S2 selects between RS-422 and RS-485, and S1 selects between 2-wire and 4-wire RS-485.

| Mode | S1 | S2 | S3 |
|---|---|---|---|
| RS-232 | --- | --- | ON |
| RS-422 | --- | ON | OFF |
| 4-Wire RS-485 | ON | OFF | OFF |
| 2-Wire RS-485 | OFF | OFF | OFF |

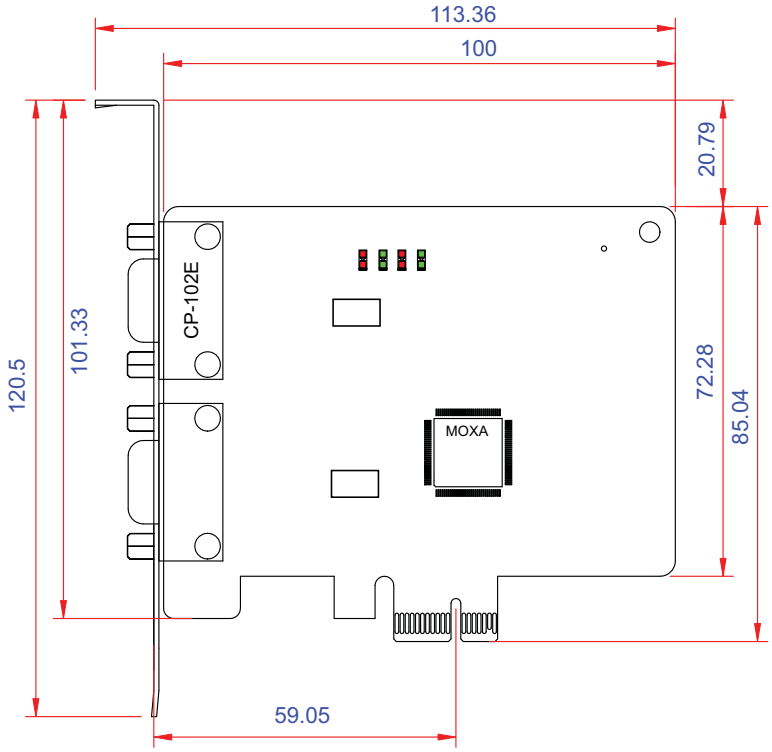
# CP-168EL Dimensions (Unit= mm)



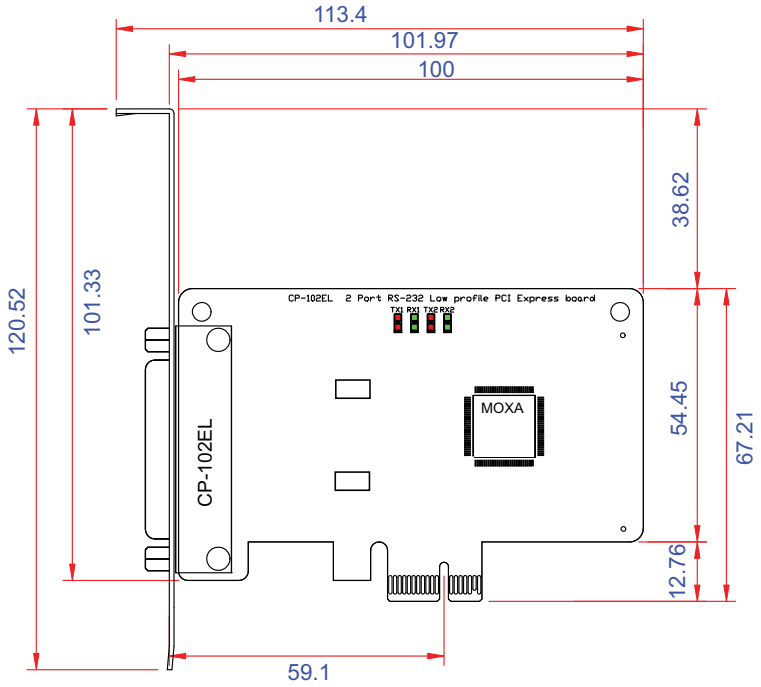

# CP-104EL Dimensions (Unit= mm)



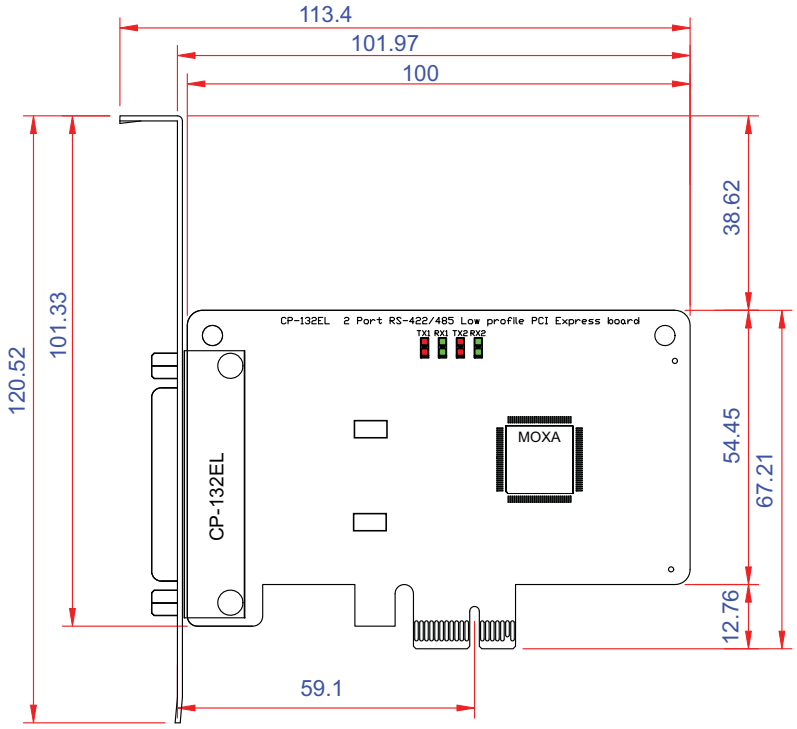
# CP-102E Dimensions (Unit: mm)



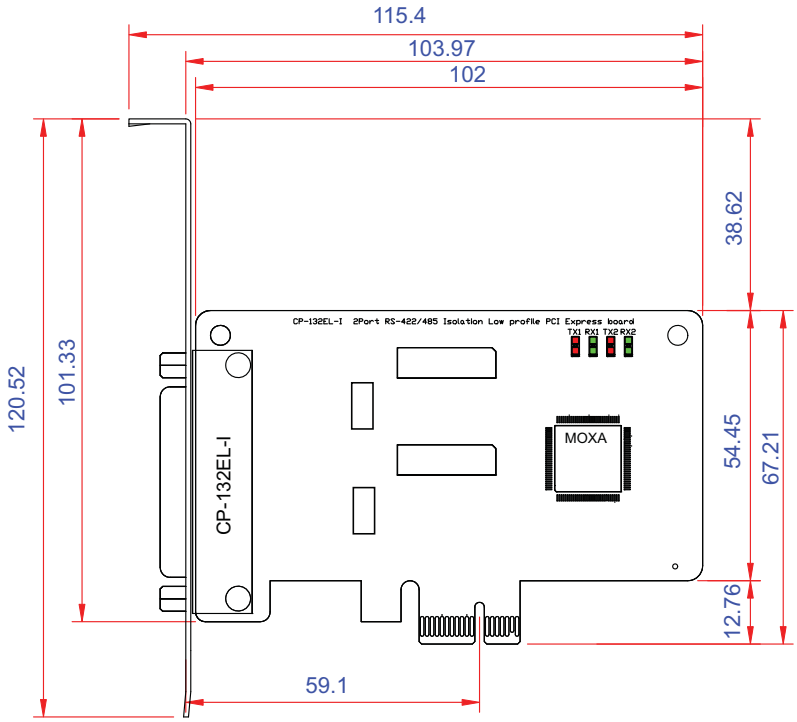

# CP-102EL Dimensions (Unit: mm)



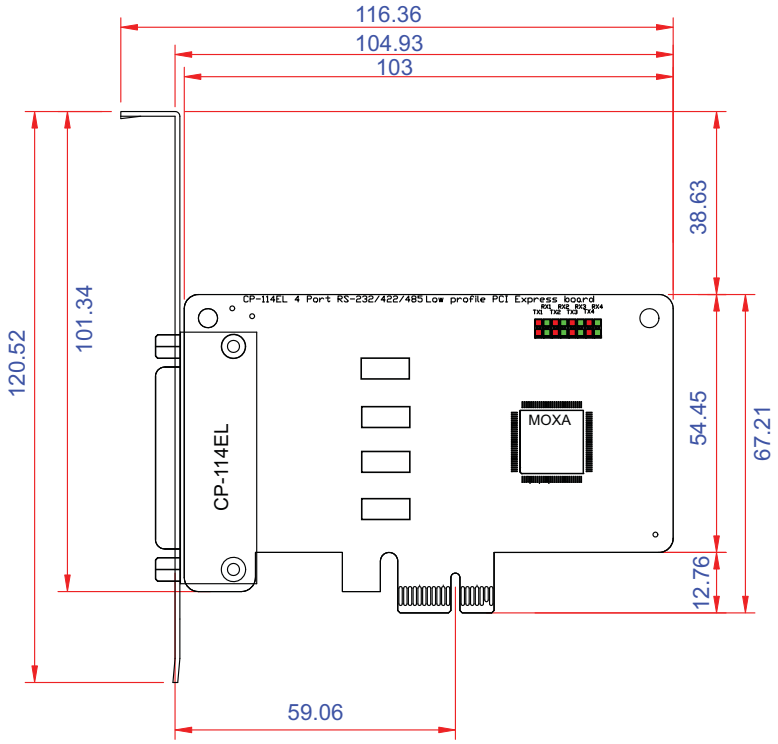
# CP-132EL Dimensions (Unit: mm)



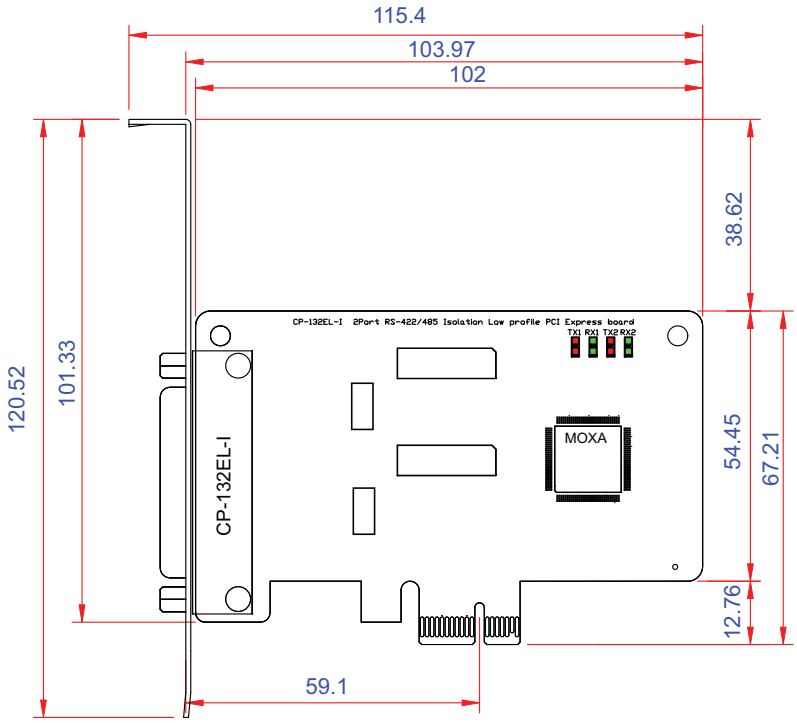

# CP-132EL-I Dimensions (Unit: mm)



# CP-114EL Dimensions (Unit: mm)




# CP-114EL-I Dimensions (Unit: mm)



# Plugging the Board into an Expansion Slot

Since the BIOS automatically assigns the PCI Express board's IRQ number and I/O addresses, you must plug the board into one of the computer's expansion slots before installing the driver.

**Step 1:** Power off the PC.

WARNING

To avoid damaging your system and board, make sure you turn off your computer before installing the board.

**Step 2:** Remove the PC's cover.

**Step 3:** Remove the slot cover bracket if there is one.

**Step 4:** Use the onboard DIP Switches to set the transmission mode for each port (see the previous section for details); (CP-118EL only)

**Step 5:** Plug the PCI Express board firmly into a free PCI Express slot.

**Step 6:** Fasten the holding screw to fix the control board in place.

**Step 7:** Replace the PC's cover.

**Step 8:** Power on the PC. The BIOS will automatically set the IRQ and I/O address.

NOTE Each Moxa PCI Express board uses one unique IRQ and I/O address, both of which are assigned automatically by the PCI BIOS.

**Step 9:** Proceed with the software installation discussed in the next chapter, "Software Installation."

# 3

# Software Installation

This chapter gives installation, configuration, and update/removal procedures for the driver for Windows 2000, Windows 2003/XP/Vista/2008 (32-bit/64-bit), DOS, Linux (32-bit/64-bit), and SCO, and WinCE 5.0. Before proceeding with the software installation, complete the hardware installation discussed in the previous chapter, "Hardware Installation."

Refer to the next chapter, "Serial Programming Tools," for information about developing your own serial programming applications. Note that you can install up to 4 PCI Express boards in one system, provided sufficient I/O address and IRQ number resources are available.

You can download the Windows 2000/XP/2003/Vista/2008, DOS, Linux, and SCO, and WinCE 5.0 drivers from the Moxa website.

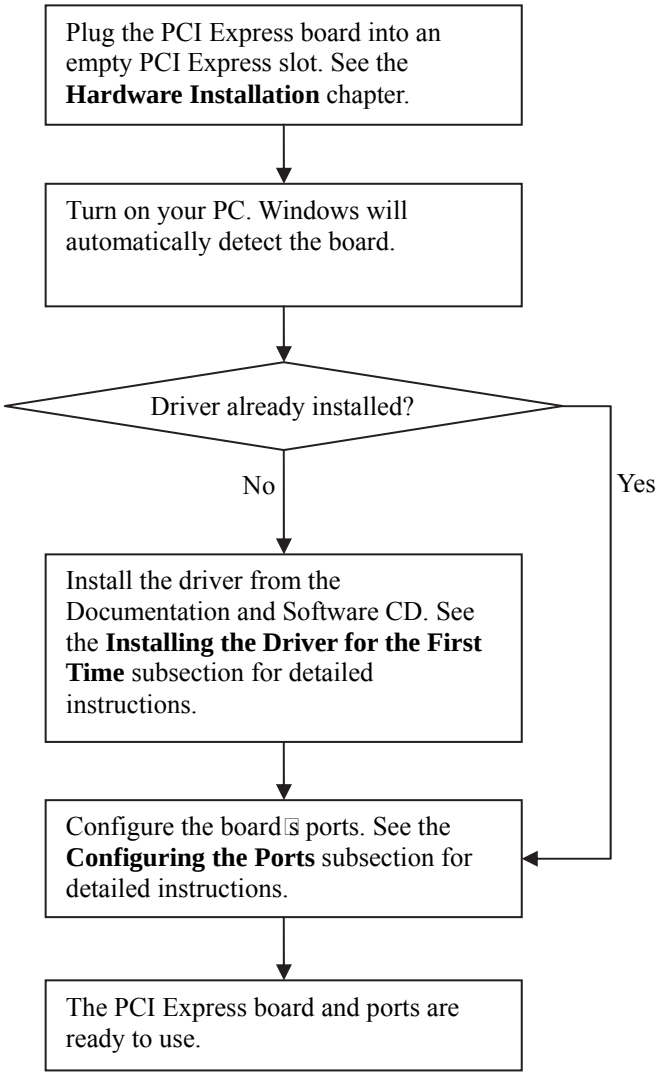
This chapter covers the following topics:


- **Windows Drivers**
  - Windows 2008/Vista (32-bit/64-bit)
  - Windows 2003/XP (32-bit/64-bit)
  - Windows 2000
- **Non-Windows Drivers**
  - DOS
  - Linux (32-bit/64-bit)
  - SCO
- **Windows CE 5.0**
  - Installing the driver

# Windows Drivers

Moxa provides drivers that allow you to use the following serial board products under Windows 2008/Vista/2003/XP/2000, Windows 98/95, and Windows NT. Windows 95/98/NT do not support PCI Express drivers.

The overall procedure for installing the Windows drivers for the PCI Express boards is summarized in the flowchart on the right.


Plug the PCI Express board into an empty PCI Express slot. See the **Hardware Installation** chapter.
Turn on your PC. Windows will automatically detect the board.
Driver already installed?
No
Yes
Install the driver from the Documentation and Software CD. See the **Installing the Driver for the First Time** subsection for detailed instructions.
Configure the board's ports. See the **Configuring the Ports** subsection for detailed instructions.
The PCI Express board and ports are ready to use.

**WARNING**

If you are installing a PCI Express board on an ASUS A8N Series (AMD CPU) motherboard and the installation process hangs the first time, then restart the PC to reinstall it.

**NOTE** The following steps use CP-114EL as an example.

# Windows 2008/Vista (32-bit/64-bit)

In this section, we describe the installation procedure for Windows Vista. The installation procedure for Windows 2008 is similar.

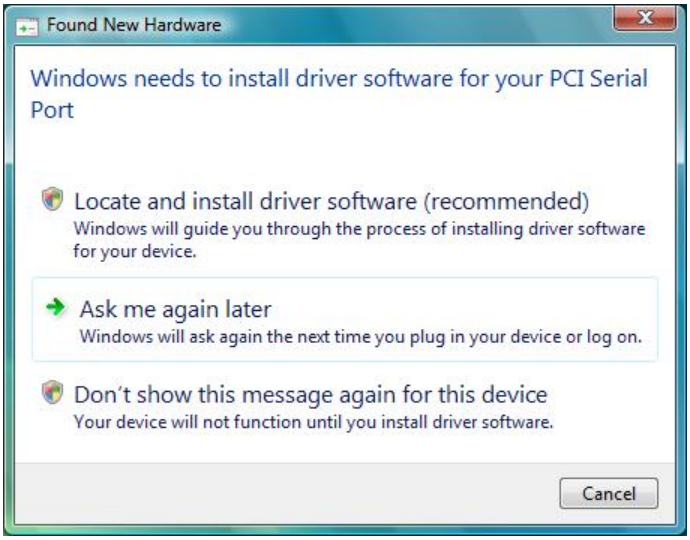
Windows 2008 and Windows Vista support up to 256 serial ports from COM1 to COM256. In order to make the best use of Windows 2008/Vista's multi-process/multi-thread advanced features, 32-bit and 64-bit Windows 2008/Vista device drivers were developed for Moxa multiport boards. The drivers conform to the Win32 COMM API standard.

## Installing the Driver

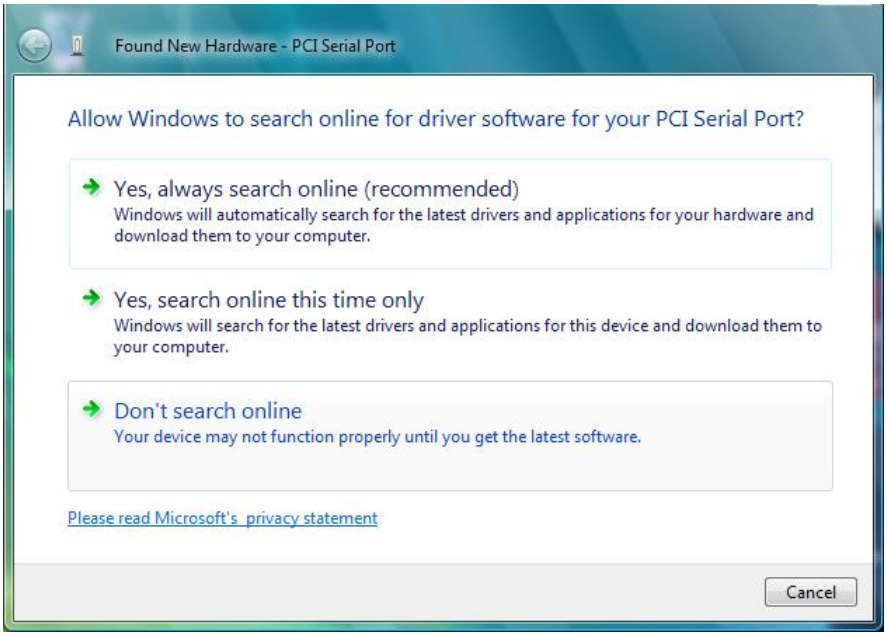
The following procedure describes how to install the CP-114EL driver for the first time with Windows Vista. First, make sure that you have already plugged the board or boards into the system's PCI Express slot(s).

NOTE If you have already installed a CP-114EL or other Moxa PCI Express board in your computer, and you are installing additional boards, Windows 2008/Vista will automatically detect and install the new board(s) the next time you boot up the computer. In this case, proceed directly to the next section, "Configuring the Ports," to configure the ports' serial transmission parameters.

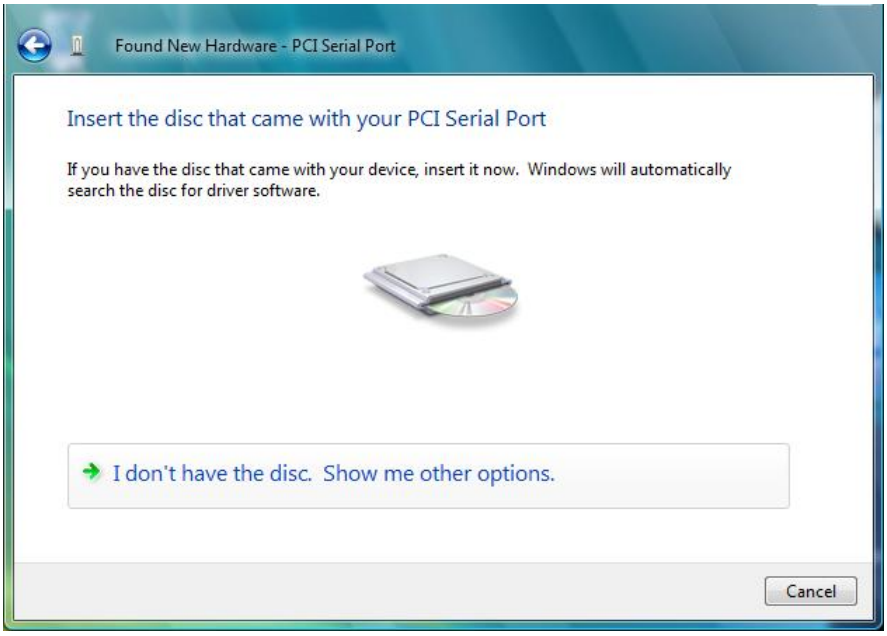
1. After plugging the board into an expansion slot and powering on your PC, Windows Vista will automatically detect the new board, and the **Found New Hardware** window will open.

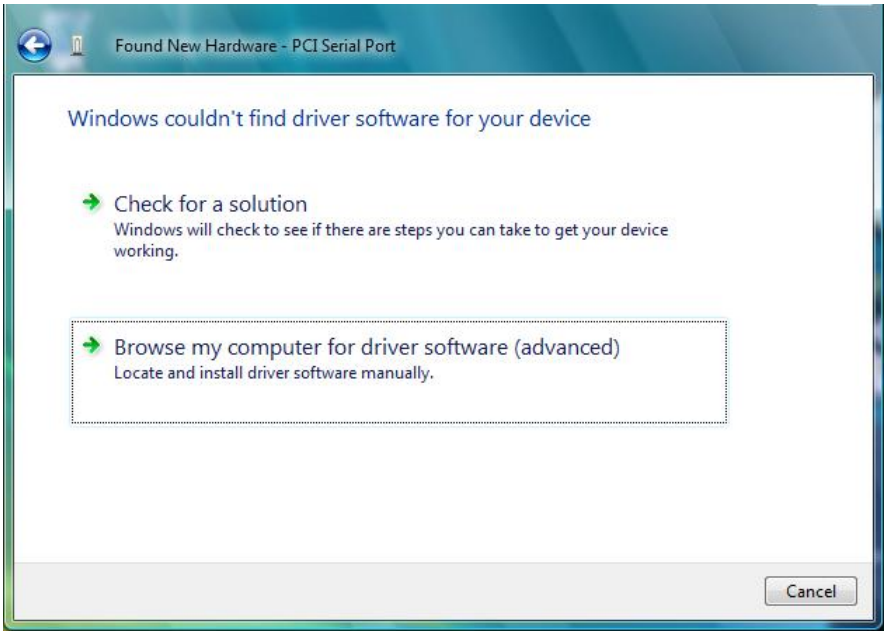

Found New Hardware
Windows needs to install driver software for your PCI Serial Port
Locate and install driver software (recommended)
Windows will guide you through the process of installing driver software for your device.
Ask me again later
Windows will ask again the next time you plug in your device or log on.
Don't show this message again for this device
Your device will not function until you install driver software.
Cancel

2. The **Found New Hardware – PCI Serial Port** window will open automatically. This window will offer to connect to the Windows update site to search for a driver. Select **Don't search online**.


Found New Hardware - PCI Serial Port
Allow Windows to search online for driver software for your PCI Serial Port?
Yes, always search online (recommended)
Windows will automatically search for the latest drivers and applications for your hardware and download them to your computer.
Yes, search online this time only
Windows will search for the latest drivers and applications for this device and download them to your computer.
Don't search online
Your device may not function properly until you get the latest software.
Please read Microsoft's privacy statement
Cancel

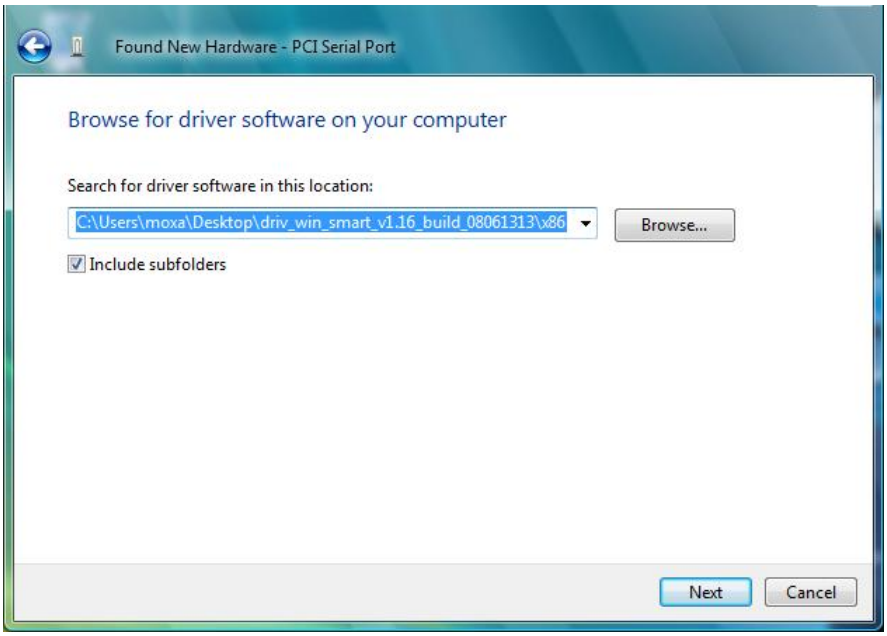
3. Select **I don't have the disc. Show me other options**, and then click **Browse my computer for device software (advanced)** to continue.


Found New Hardware - PCI Serial Port
Insert the disc that came with your PCI Serial Port
If you have the disc that came with your device, insert it now. Windows will automatically search the disc for driver software.
I don't have the disc. Show me other options.
Cancel

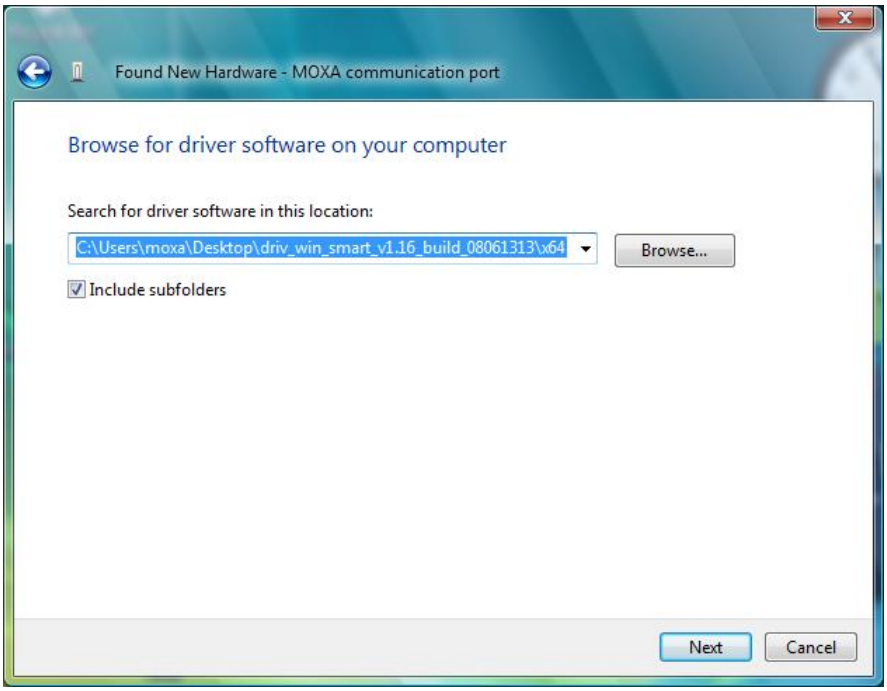

Found New Hardware - PCI Serial Port
Windows couldn't find driver software for your device
Check for a solution
Windows will check to see if there are steps you can take to get your device working.
Browse my computer for driver software (advanced)
Locate and install driver software manually.
Cancel

4. Select **Search for driver software in this location**, select **Include subfolders**, and then click **Browse**. If the system is a 32-bit (x86) platform, navigate to the **\CP-114EL Series\Software\Windows 2008_Vista\x86** folder on the CD. If the system is a 64-bit (x64) platform, navigate to the **\CP-114EL Series\Software\Windows 2008_Vista\x64** folder on the CD, and then click **Next** to continue.

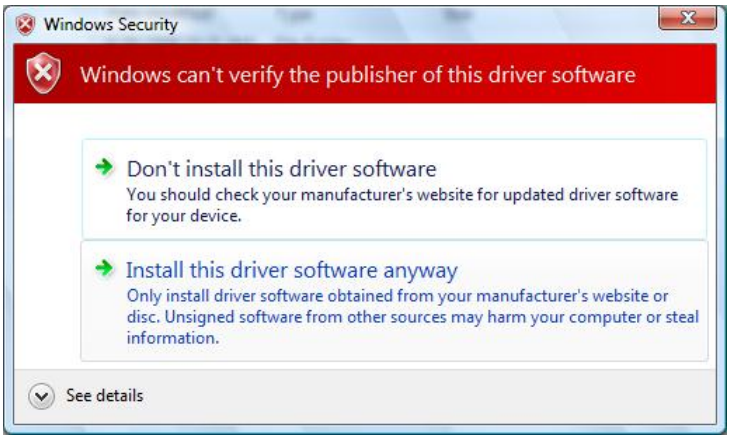
   The following figure shows the path for x86.



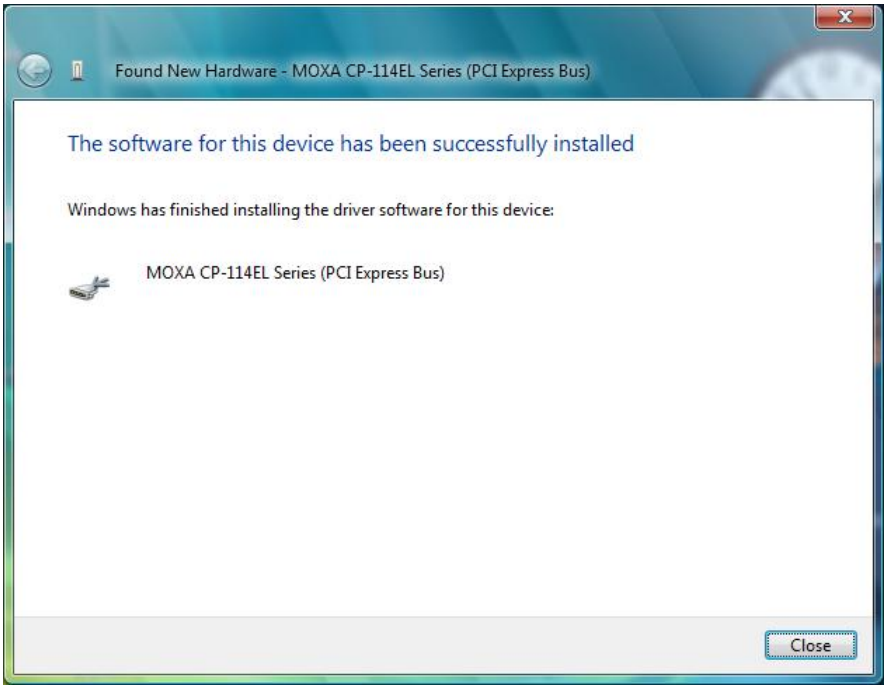
The following figure shows the path for x64.



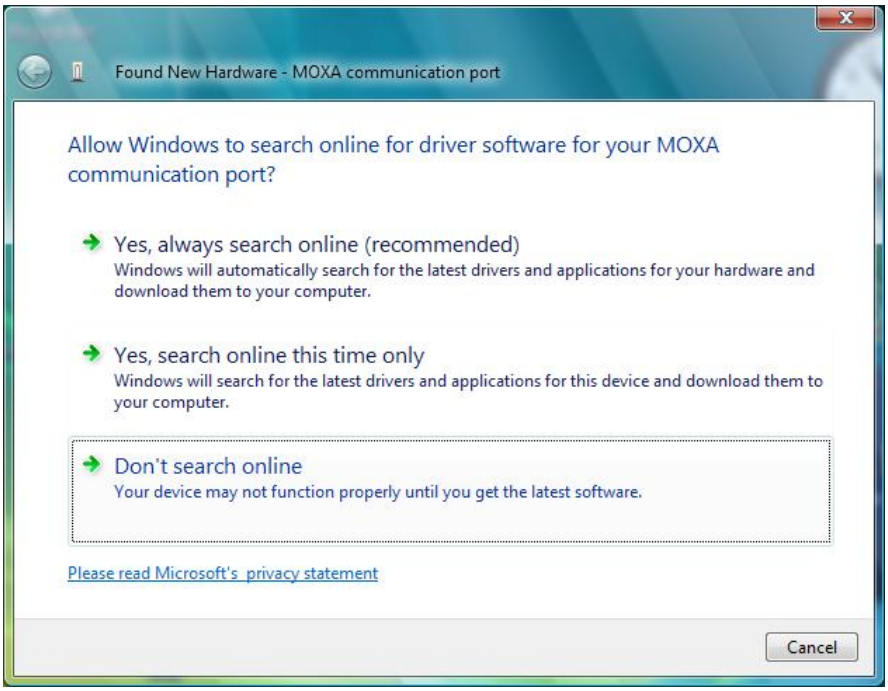

5. Wait while the installation wizard searches for the correct drivers. The next window that opens cautions you that although this software has not passed Windows Logo testing, the driver has been tested and shown that it can support the Windows OS. Click **Install this driver software anyway** to proceed.


Windows Security
Windows can't verify the publisher of this driver software
Don't install this driver software
You should check your manufacturer's website for updated driver software for your device.
Install this driver software anyway
Only install driver software obtained from your manufacturer's website or disc. Unsigned software from other sources may harm your computer or steal information.
See details

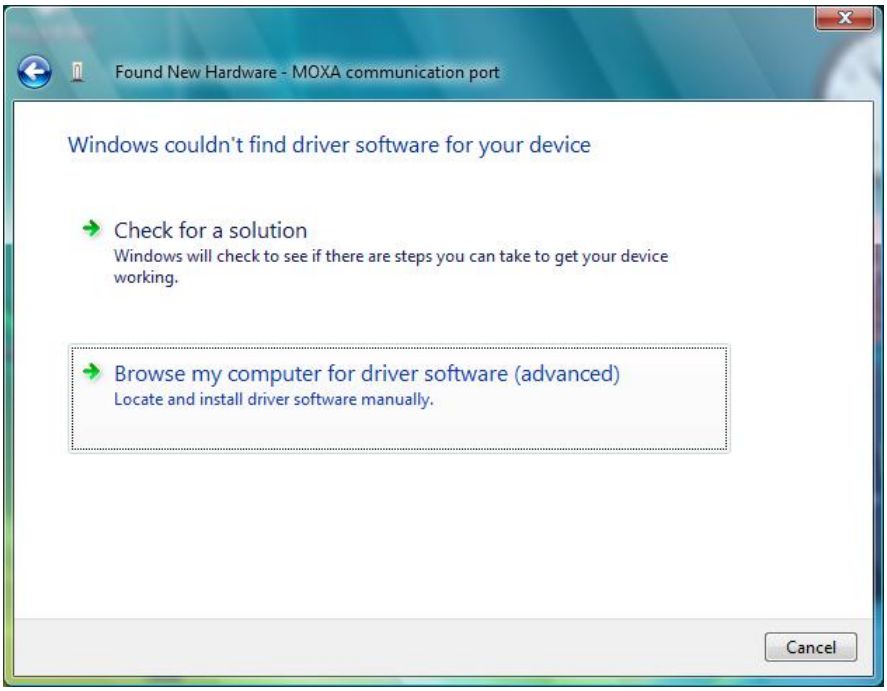
6. Wait while the driver software is installed. The next window shows the model name of the board, and indicates that Windows has completed the driver installation. Click **Close** to proceed with the rest of the installation procedure.


Found New Hardware - MOXA CP-114EL Series (PCI Express Bus)
The software for this device has been successfully installed
Windows has finished installing the driver software for this device:
MOXA CP-114EL Series (PCI Express Bus)
Close

7. The Found New Hardware window will open to help you install the driver for MOXA Port 0. Select **Don't search online**.

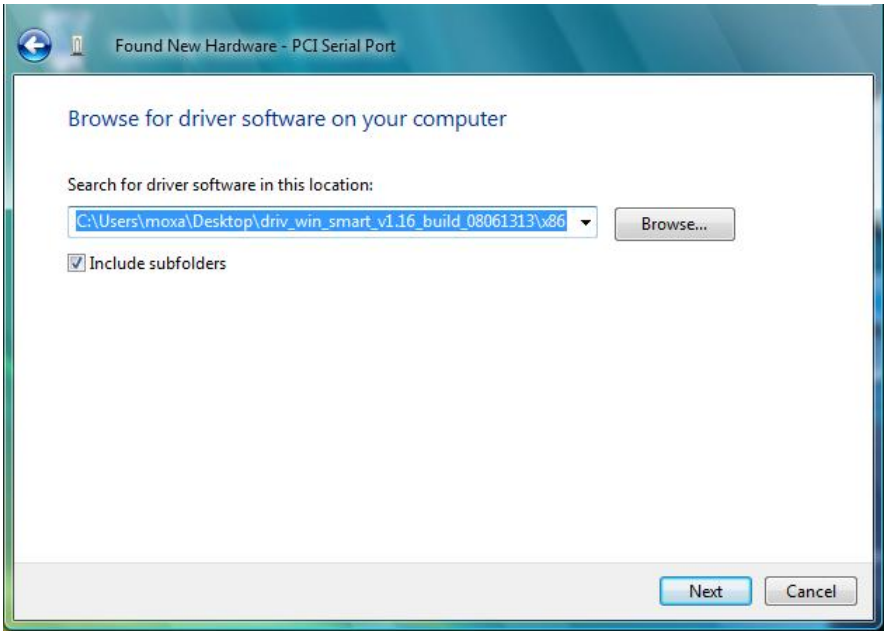

Found New Hardware - MOXA communication port
Allow Windows to search online for driver software for your MOXA communication port?
Yes, always search online (recommended)
Windows will automatically search for the latest drivers and applications for your hardware and download them to your computer.
Yes, search online this time only
Windows will search for the latest drivers and applications for this device and download them to your computer.
Don't search online
Your device may not function properly until you get the latest software.
Please read Microsoft's privacy statement
Cancel

8. Select **Browse my computer for driver software (advanced)**.

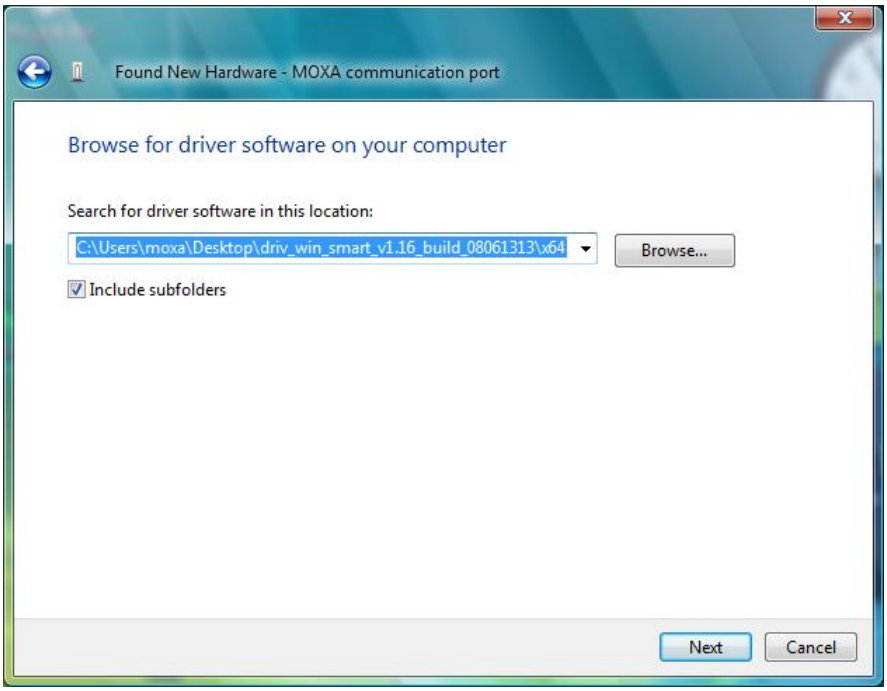

Found New Hardware - MOXA communication port
Windows couldn't find driver software for your device
Check for a solution
Windows will check to see if there are steps you can take to get your device working.
Browse my computer for driver software (advanced)
Locate and install driver software manually.
Cancel

9. Select **Search for driver software in this location**, select **Include subfolders**, and then click **Browse**. If the system is a 32-bit (x86) platform, navigate to the **\CP-114EL Series\Software\Windows 2008_Vista\x86** folder on the CD. If the system is a 64-bit (x64) platform, navigate to the **\CP-114EL Series\Software\Windows 2008_Vista\x64** folder on the CD, and then click **Next** to continue.

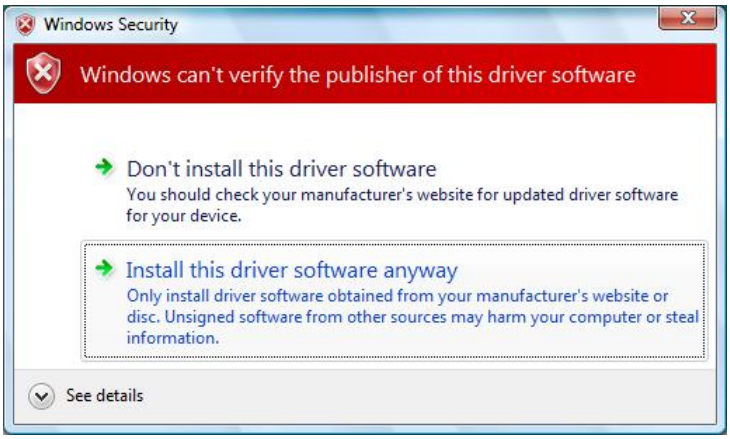
   The following figure shows the path for x86.



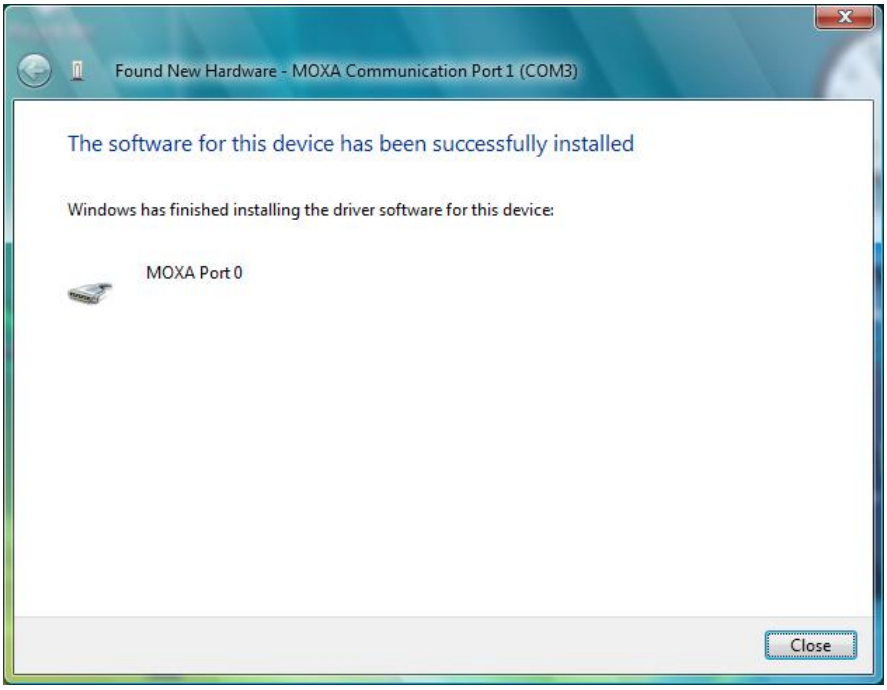
The following figure shows the path for x64.



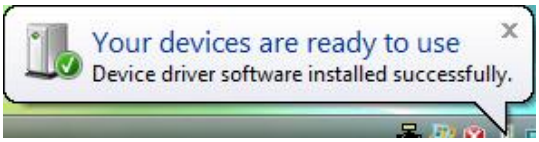

10. Wait while the installation wizard searches. The next window that opens cautions you that although this software has not passed Windows Logo testing, the driver has been tested and shown that it can support the Windows OS. Click **Install this driver software anyway** to proceed.


Windows Security
Windows can't verify the publisher of this driver software
Don't install this driver software
You should check your manufacturer's website for updated driver software for your device.
Install this driver software anyway
Only install driver software obtained from your manufacturer's website or disc. Unsigned software from other sources may harm your computer or steal information.
See details

11. After all files have been copied to the system, the **software for this device has been successfully installed** window will open to indicate that it has finished installing **Port 0**. Port installation procedure is complete when Port 0 has been set up.


Found New Hardware - MOXA Communication Port 1 (COM3)
The software for this device has been successfully installed
Windows has finished installing the driver software for this device:
MOXA Port 0
Close

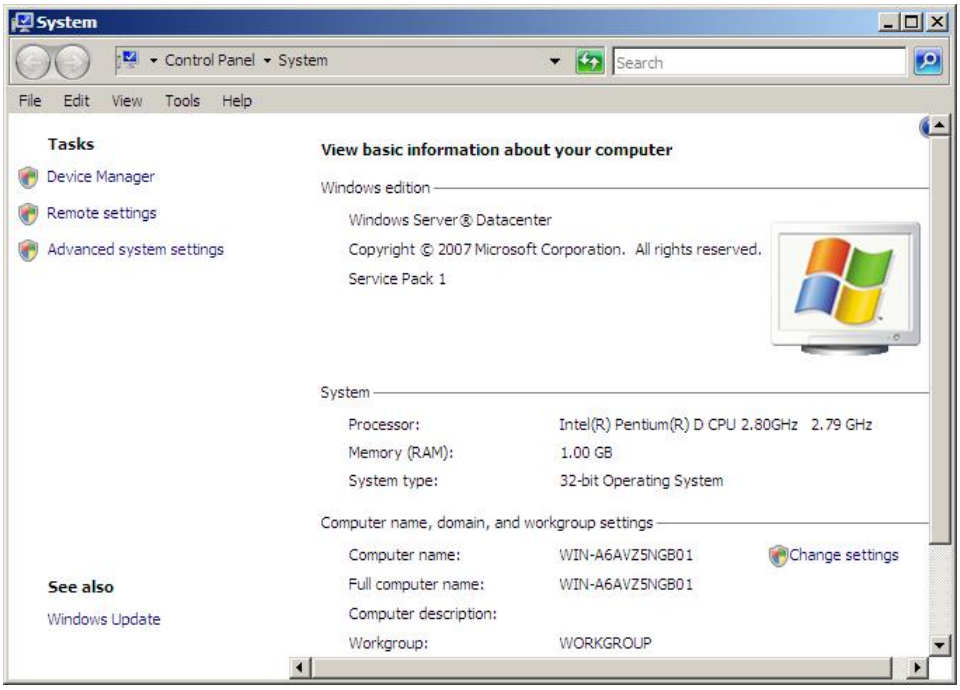
12. The "Your devices are ready to use" will reappear to inform you that the hardware was installed successfully.



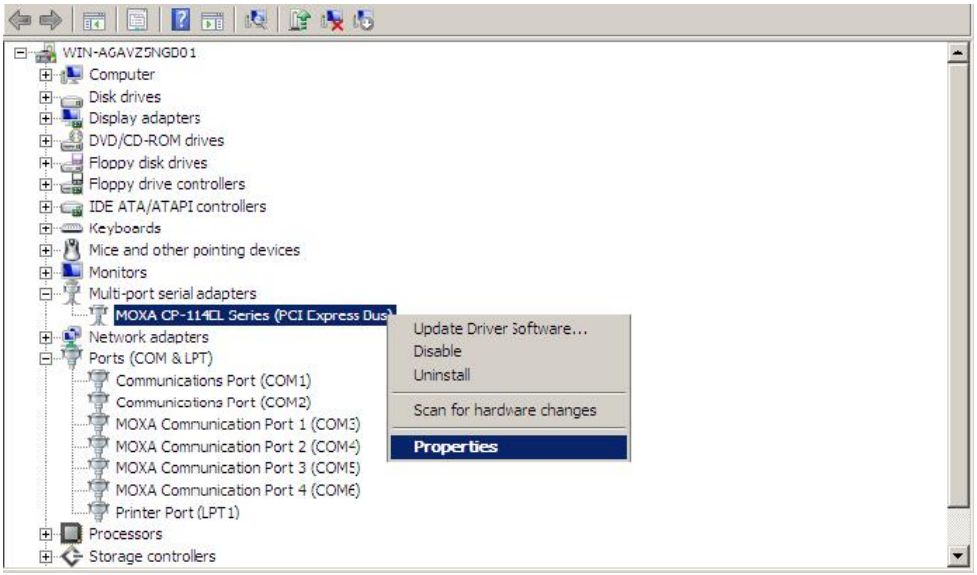

## Configuring the Ports

After the driver has been installed, use Device Manager to configure the CP-114EL serial ports.

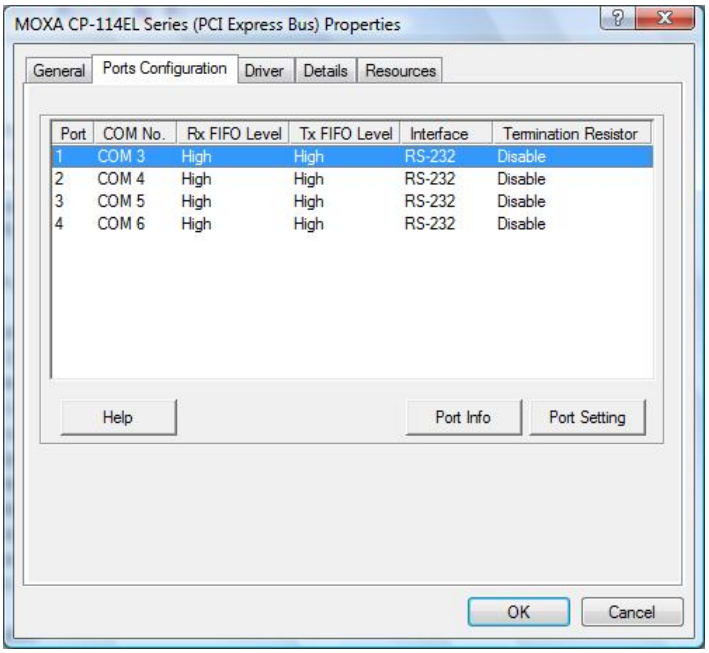
1. Click **Start → Settings → Control Panel → System**, select the **Hardware** tab, and then click **Device Manager**.



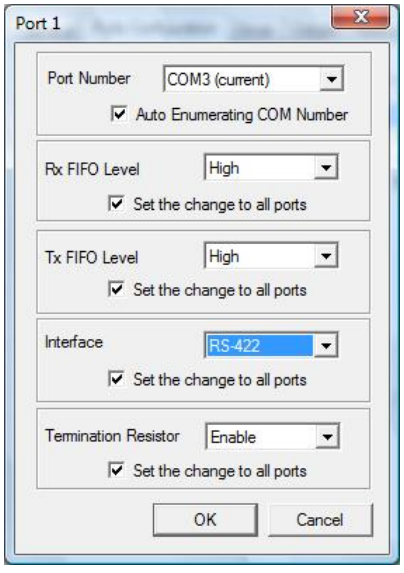

2. Expand the **Multi-port serial adapters** tab, right click **MOXA CP-114EL Series (PCI Express Bus)**, and then click **Properties** to open the board's configuration panel.



3. Click the port you would like to configure to highlight it, and then click **Port Setting**.



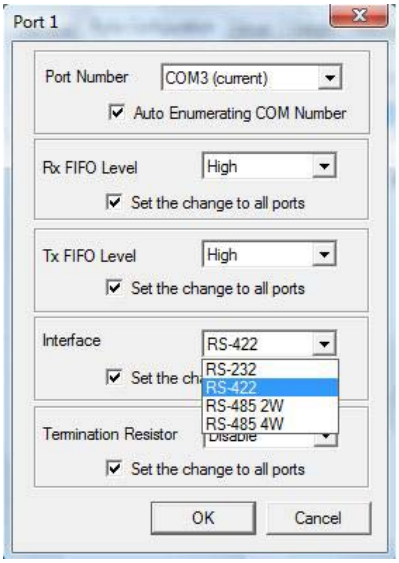

4. Select a COM number for the port from the **Port Numbe**r pull-down list.
5. Select the **Auto Enumerating COM Number** option to map subsequent ports automatically. The port numbers will be assigned in sequence. For example, if COM 3 is assigned to Port 1, then COM 4 (if not already occupied) will be assigned to Port 2, etc.
6. Select an **Rx FIFO** Trigger from the **Rx FIFO Level** pull-down list. Rx FIFO trigger levels of **High, Middle**, and **Low** are available, with the default set to High (120 bytes). Select **Set the change to all ports** option to apply this Rx FIFO Trigger to all ports.
7. Select a **Tx FIFO Level** from the **Tx FIFO Level** pull-down list. Tx FIFO Levels of **High, Middle**, and **Low** are available, with the default set to High (128 bytes). Select **Set the change to all ports** option to apply the just defined Tx FIFO Size to all ports.

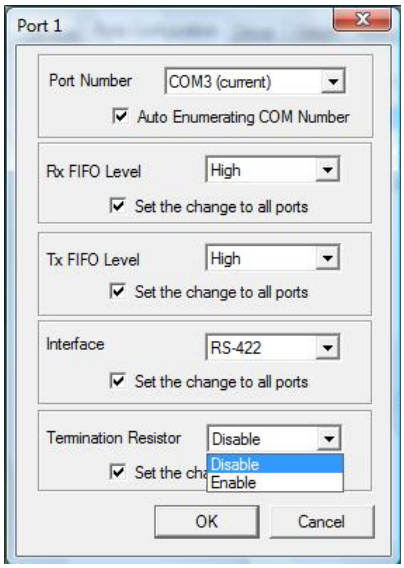



| | Tx FIFO | Rx FIFO |
|---|---|---|
| High | 128 | 120 |
| Middle | 64 | 60 |
| Low | 1 | 1 |

Unit: Bytes

8. If you use the CP-114EL, CP-114EL-I, CP-132EL, CP-132EL-I, select **Interface** (RS-232, RS-422, 2-wire RS-485, 4-wire RS-485) and **Termination Resistor** (120Ω, Enable or Disable) to configure. Take CP-114EL for example. If you would like to configure as RS-422 and no Termination Resistor, please see figures below. However, if you use the CP-118EL, please refer to Chapter 2 to configure Interface by DIP switch and Termination Resistor by jumper.



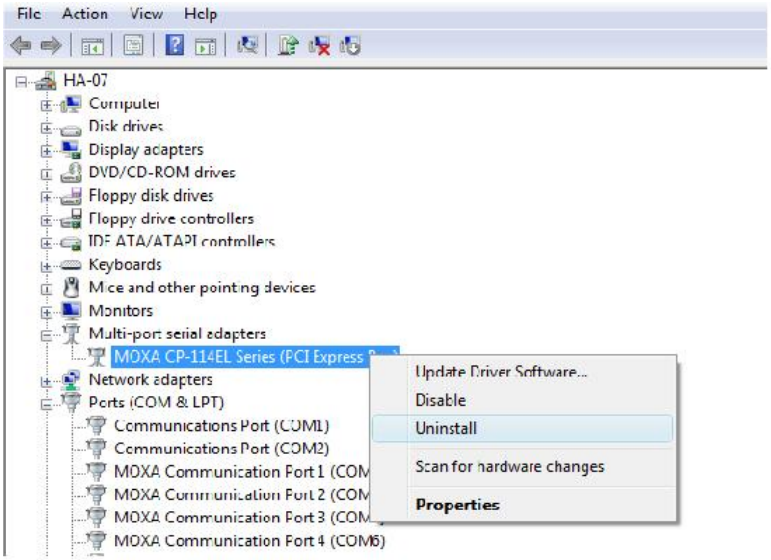

9. Click **OK** to save the port settings, and then click **OK** in the **Property** window to finish the port settings procedure.

## Using Event Log

To use the **Event Log** to check the installation of your MOXA boards, click **Start** → **Settings** → **Control Panel** → **Administrative Tools** → **Event Viewer** to enter the Event Viewer utility. Look under the System category to find the latest information relevant to Moxa's drivers.

## Removing the Driver

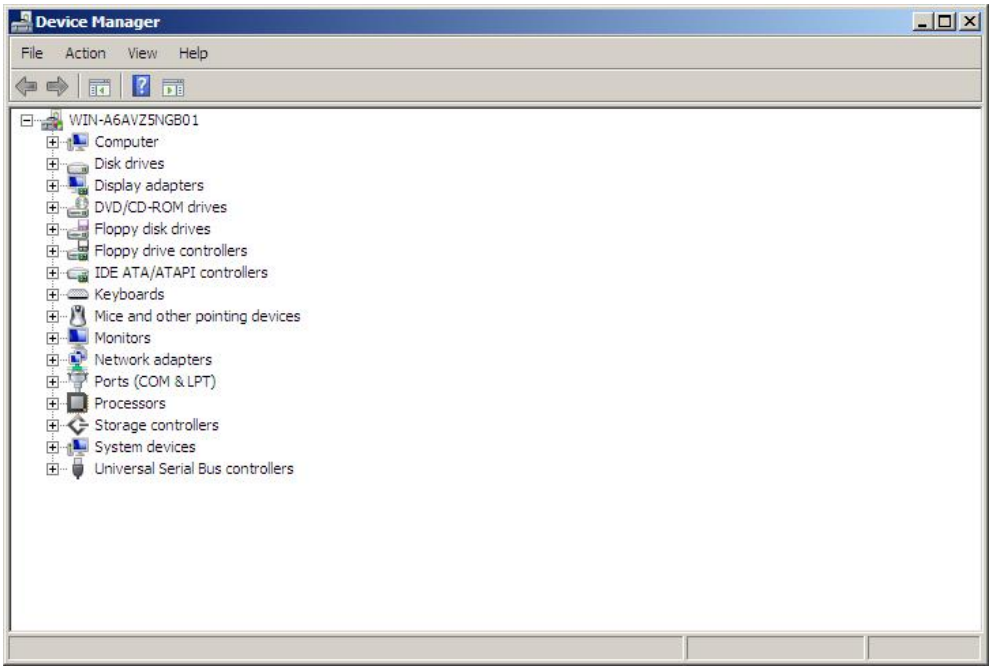
1. To uninstall the driver, click **Start** → **Settings** → **Control Panel** → **System**, select the **Hardware** tab, and then click **Device Manager**. Use the mouse to place the cursor over the CP-114EL Series board under **Multi-port serial adapters**, and then click the right mouse button. Select the **Uninstall** option.




2. Select **Delete the driver software for this device** and click **OK** to proceed with uninstalling the board.

Confirm Device Uninstall
MOXA CP-114EL Series (PCI Express Bus)
Warning: You are about to uninstall this device from your system.
Delete the driver software for this device.
OK
Cancel

3. The **Device Manager** window refreshes automatically, showing that the driver and ports for the CP-114EL Series board have been removed.




# Windows 2003/XP (32-bit/64-bit)

In this section, we describe the installation procedure for Windows XP. The installation procedure for Windows 2003 is similar.

Windows 2003/XP support up to 256 serial ports, from COM1 to COM256. In order to make the best use of Windows 2003/XP's multi-process/multi-thread advanced features, 32-bit and 64-bit Windows 2003/XP device drivers were developed for Moxa multiport boards. The drivers conform to the Win32 COMM API standard.

## Installing the Driver

The following procedure shows how to install the CP-118EL driver for the first time under Windows XP. First, make sure that you have already plugged the board or boards into the system's PCI Express slot(s).

NOTE If you have already installed a CP-118EL or other Moxa PCI Express board in your computer, and you are installing additional boards, Windows 2003/XP will automatically detect and install the new board(s) the next time you boot up the computer. In this case, proceed directly to the next section, "Configuring the Ports," to configure the ports' serial transmission parameters.

1. After plugging the board into an expansion slot and powering on your PC, Windows XP will automatically detect the new board, and the **Found New Hardware** balloon will open in the bottom right corner of the Windows desktop.

2. The **Welcome to the Found New Hardware Wizard** window will open automatically. This window will offer to connect to the Windows update site to search for a driver. Select **No, not at this time** and click **Next** to continue.

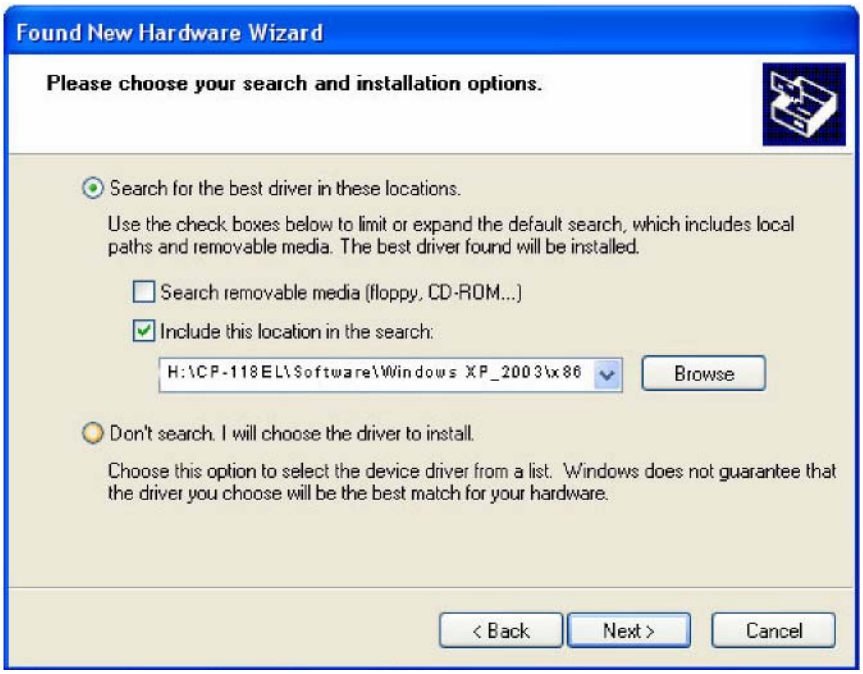
Found New Hardware Wizard
Welcome to the Found New Hardware Wizard
Windows will search for current and updated software by looking on your computer, on the hardware installation CD, or on the Windows Update Web site (with your permission).
Online privacy information
Can Windows connect to Windows Update to search for software?
Yes, this time only
Yes, now and every time I connect a device
No, not this time
Click Next to continue.
< Back
Next >
Cancel

3. Select **Install from a list or specific location (Advanced)**, and then click **Next** to continue

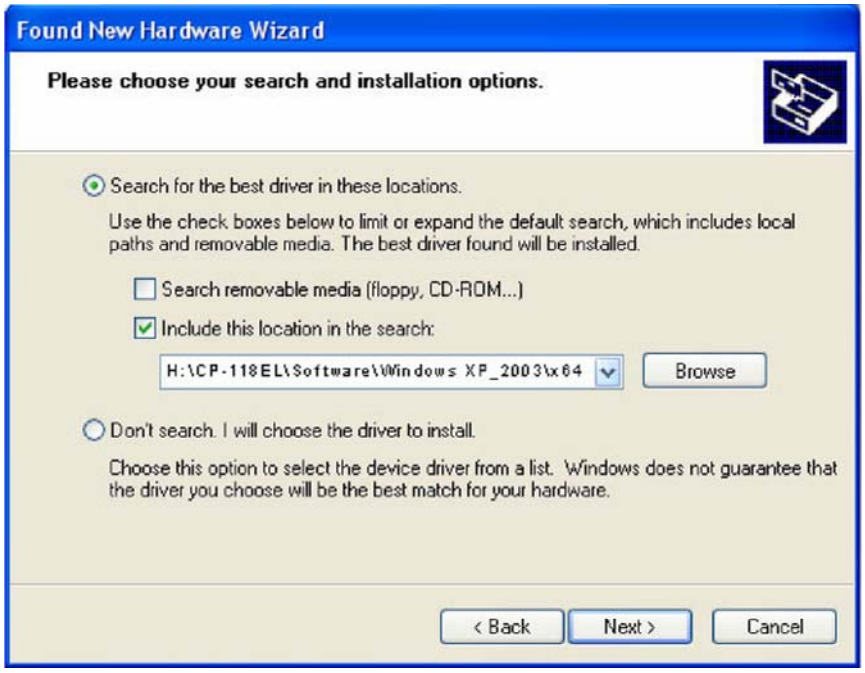
Found New Hardware Wizard
This wizard helps you install software for:
PCI Serial Port
If your hardware came with an installation CD or floppy disk, insert it now.
What do you want the wizard to do?
Install the software automatically (Recommended)
Install from a list or specific location (Advanced)
Click Next to continue.
< Back
Next >
Cancel

4. Select Search **for the best driver in these locations**, select **Include this location in the search**, and then click **Browse**. If the system is a 32-bit (x86) platform, navigate to the **\CP-118EL\Software\Windows XP_2003\x86** folder on the CD. If the system is a 64-bit (x64) platform, navigate to the **\CP-118EL\Software\Windows XP_2003\x64** folder on the CD, and then click **Next** to continue.

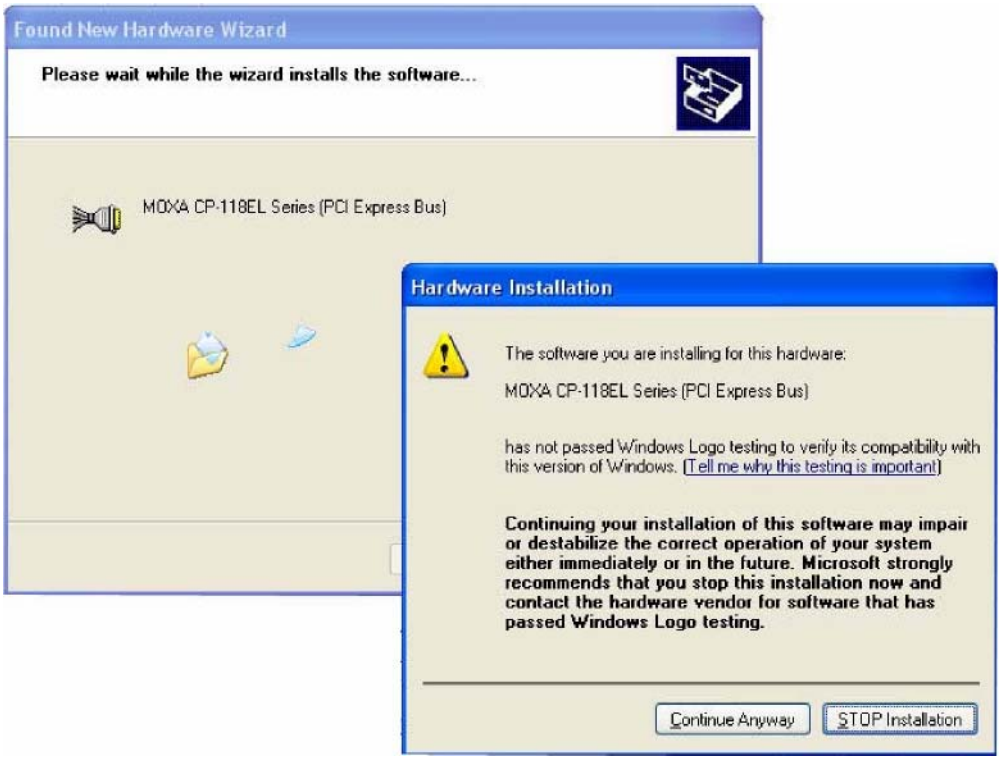
   The following figure shows the path for x86.


Found New Hardware Wizard
Please choose your search and installation options.
Search for the best driver in these locations.
Use the check boxes below to limit or expand the default search, which includes local paths and removable media. The best driver found will be installed.
Search removable media (floppy, CD-ROM...)
Include this location in the search:
H:\CP-118EL\Software\Windows XP_2003\x86
Browse
Don't search. I will choose the driver to install.
Choose this option to select the device driver from a list. Windows does not guarantee that the driver you choose will be the best match for your hardware.
< Back
Next >
Cancel

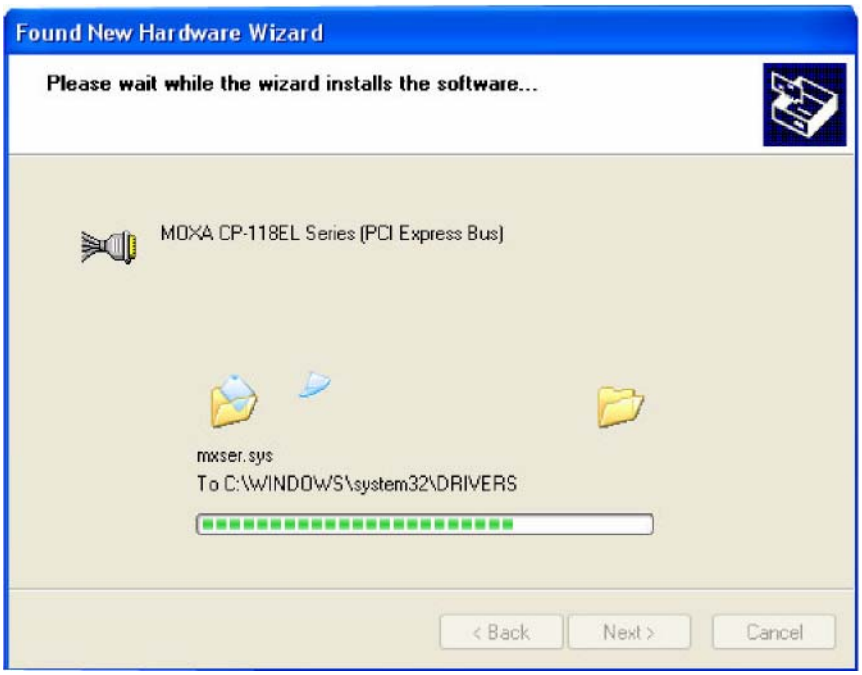
   The following figure shows the path for x64.


Found New Hardware Wizard
Please choose your search and installation options.
Search for the best driver in these locations.
Use the check boxes below to limit or expand the default search, which includes local paths and removable media. The best driver found will be installed.
Search removable media (floppy, CD-ROM...)
Include this location in the search:
H:\CP-118EL\Software\Windows XP_2003\x64
Browse
Don't search. I will choose the driver to install.
Choose this option to select the device driver from a list. Windows does not guarantee that the driver you choose will be the best match for your hardware.
< Back
Next >
Cancel

5. Wait while the installation wizard searches for the correct drivers. The next window that opens cautions you that although this software has not passed Windows Logo testing, the driver has been tested and shown that it can support the Windows OS. Click **Continue Anyway** to proceed.


Found New Hardware Wizard
Please wait while the wizard installs the software...
MOXA CP-118EL Series (PCI Express Bus)
Hardware Installation
The software you are installing for this hardware:
MOXA CP-118EL Series (PCI Express Bus)
has not passed Windows Logo testing to verify its compatibility with this version of Windows. (Tell me why this testing is important)
Continuing your installation of this software may impair or destabilize the correct operation of your system either immediately or in the future. Microsoft strongly recommends that you stop this installation now and contact the hardware vendor for software that has passed Windows Logo testing.
Continue Anyway
STOP Installation

6. Wait while the driver software is installed.



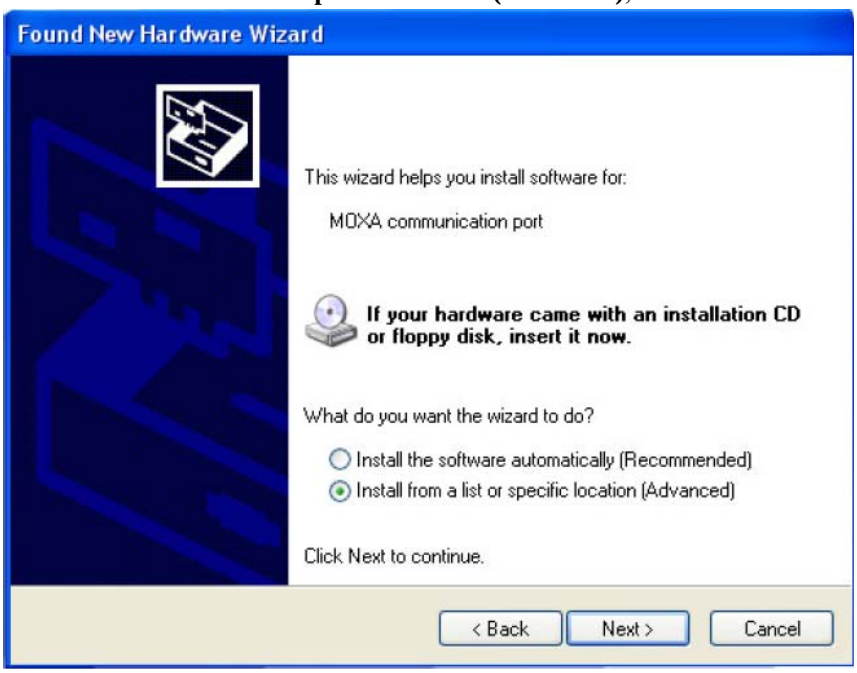
7. The next window shows the model name of the board, and indicates that Windows has completed the driver installation. Click **Finish** to proceed with the rest of the installation procedure.

Found New Hardware Wizard
Completing the Found New Hardware Wizard
The wizard has finished installing the software for:
MOXA CP-118EL Series (PCI Express Bus)
Click Finish to close the wizard.
< Back
Finish
Cancel

8. The **Found New Hardware Wizard** window will open to help you install the driver for Moxa Port 0. This window will offer to connect to the Windows update site to search for a driver. Select **No, not at this time** and then click **Next** to continue.

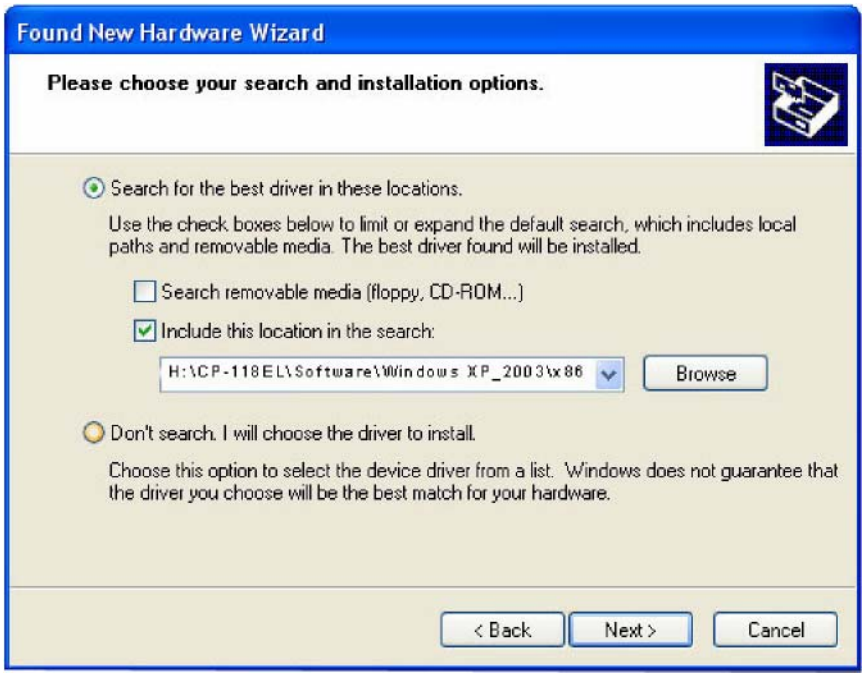
Found New Hardware Wizard
Welcome to the Found New Hardware Wizard
Windows will search for current and updated software by looking on your computer, on the hardware installation CD, or on the Windows Update Web site (with your permission).
Online privacy information
Can Windows connect to Windows Update to search for software?
Yes, this time only
Yes, now and every time I connect a device
No, not this time
Click Next to continue.
< Back
Next >
Cancel

9. Select Install **from a list or specific location (Advanced)**, and then click **Next** to proceed.

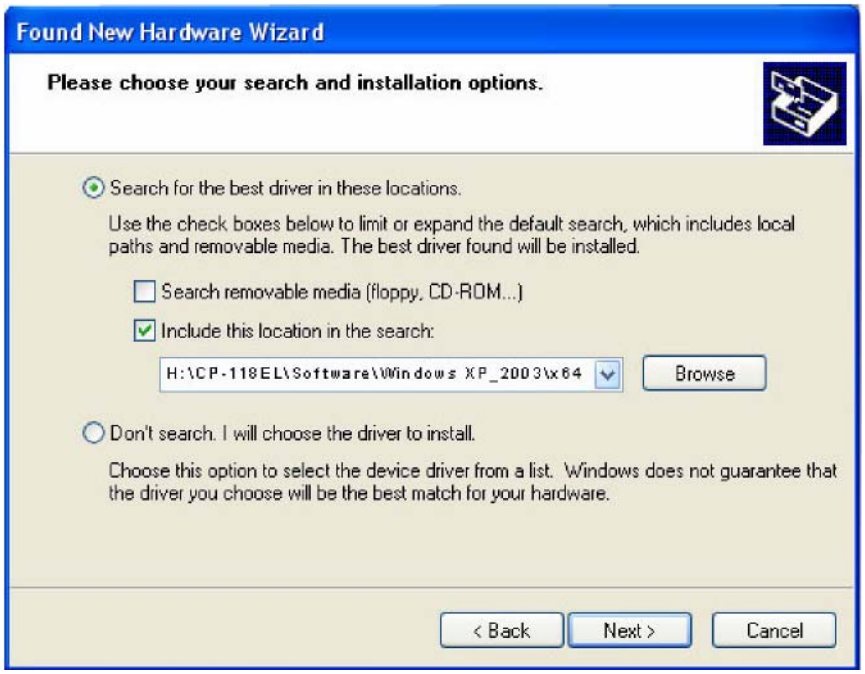

Found New Hardware Wizard
This wizard helps you install software for:
MOXA communication port
If your hardware came with an installation CD or floppy disk, insert it now.
What do you want the wizard to do?
Install the software automatically (Recommended)
Install from a list or specific location (Advanced)
Click Next to continue.
< Back
Next >
Cancel

10. Select Search **for the best driver in these locations**, select **Include this location in the search**, and then click **Browse**. If necessary, use the **Browse** button to navigate to the **\CP-118EL\Software\Windows XP_2003\x86** folder (32 bit platform) or **\CP-118EL\Software\Windows XP_2003\x64** folder (64 bit platform), and then click **Next** to proceed.

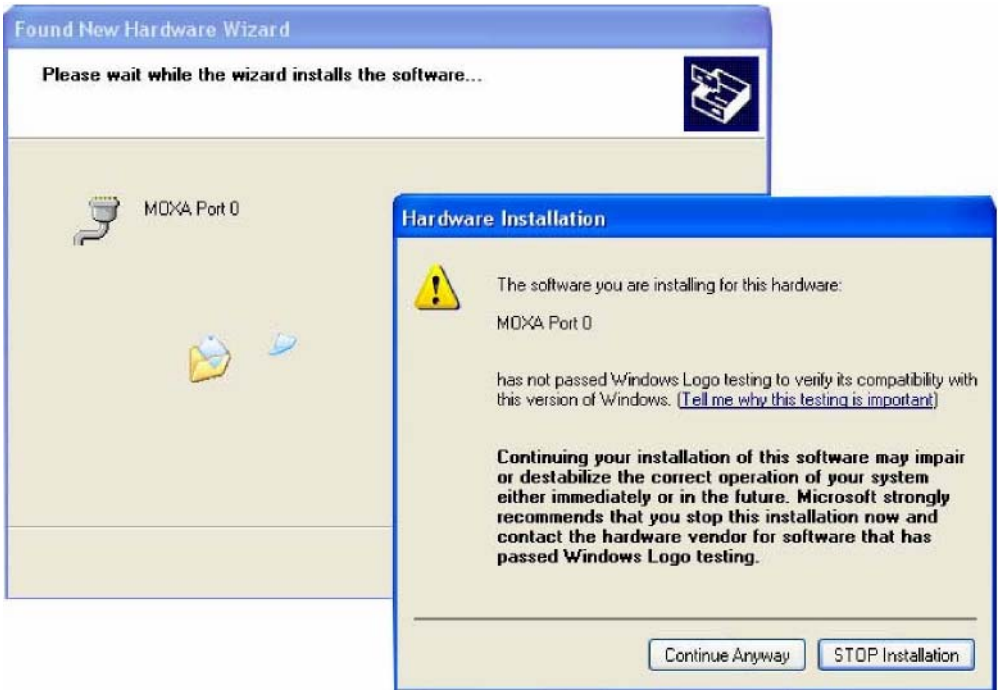
    The following figure shows the path for x86.


Found New Hardware Wizard
Please choose your search and installation options.
Search for the best driver in these locations.
Use the check boxes below to limit or expand the default search, which includes local paths and removable media. The best driver found will be installed.
Search removable media (floppy, CD-ROM...)
Include this location in the search:
H:\CP-118EL\Software\Windows XP_2003\x86
Browse
Don't search. I will choose the driver to install.
Choose this option to select the device driver from a list. Windows does not guarantee that the driver you choose will be the best match for your hardware.
< Back
Next >
Cancel

The following figure shows the path for x64.


Found New Hardware Wizard
Please choose your search and installation options.
Search for the best driver in these locations.
Use the check boxes below to limit or expand the default search, which includes local paths and removable media. The best driver found will be installed.
Search removable media (floppy, CD-ROM...)
Include this location in the search:
H:\CP-118EL\Software\Windows XP_2003\x64
Browse
Don't search. I will choose the driver to install.
Choose this option to select the device driver from a list. Windows does not guarantee that the driver you choose will be the best match for your hardware.
< Back
Next >
Cancel

11. Wait while the installation wizard searches. The next window that opens cautions you that although this software has not passed Windows Logo testing, the driver has been tested and shown that it can support the Windows OS. Click **Continue Anyway** to proceed.

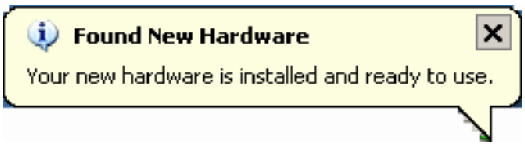

Found New Hardware Wizard
Please wait while the wizard installs the software...
MOXA Port 0
Hardware Installation
The software you are installing for this hardware:
MOXA Port 0
has not passed Windows Logo testing to verify its compatibility with this version of Windows. (Tell me why this testing is important)
Continuing your installation of this software may impair or destabilize the correct operation of your system either immediately or in the future. Microsoft strongly recommends that you stop this installation now and contact the hardware vendor for software that has passed Windows Logo testing.
Continue Anyway
STOP Installation

12. Wait while the wizard installs the software.

13. After all files have been copied to the system, the **Completing the Found New Hardware Wizard** window will open to indicate that it has finished installing **Port 0**. Click **Finish** to proceed with the rest of the installation.

14. Repeat Step 7 through Step 11 for each of the remaining seven ports. The last port to be installed will be Moxa Port 7, as shown in the following figure.

15. The **Found New Hardware** balloon will reappear to inform you that the hardware was installed successfully.



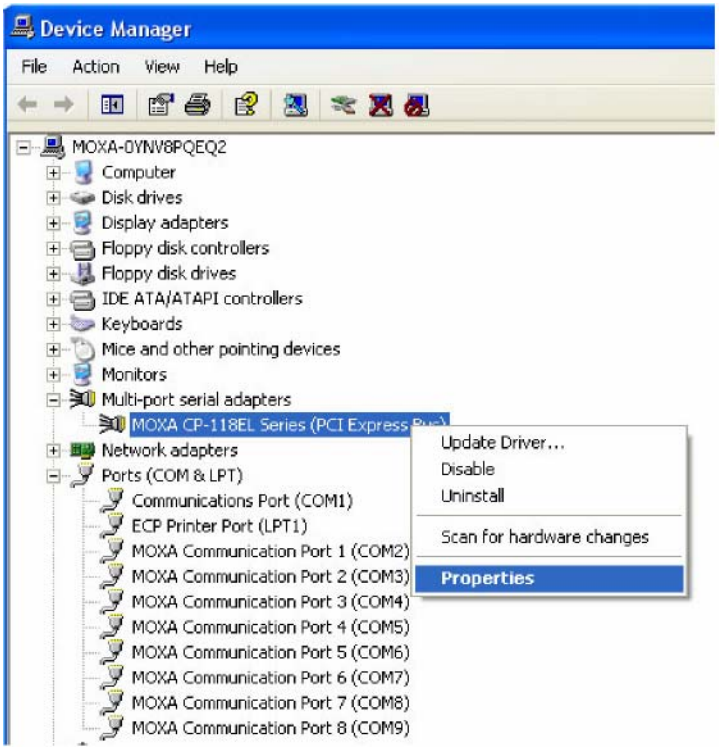
## Configuring the Ports

After the driver has been installed, use Device Manager to configure the CP-118EL serial ports.

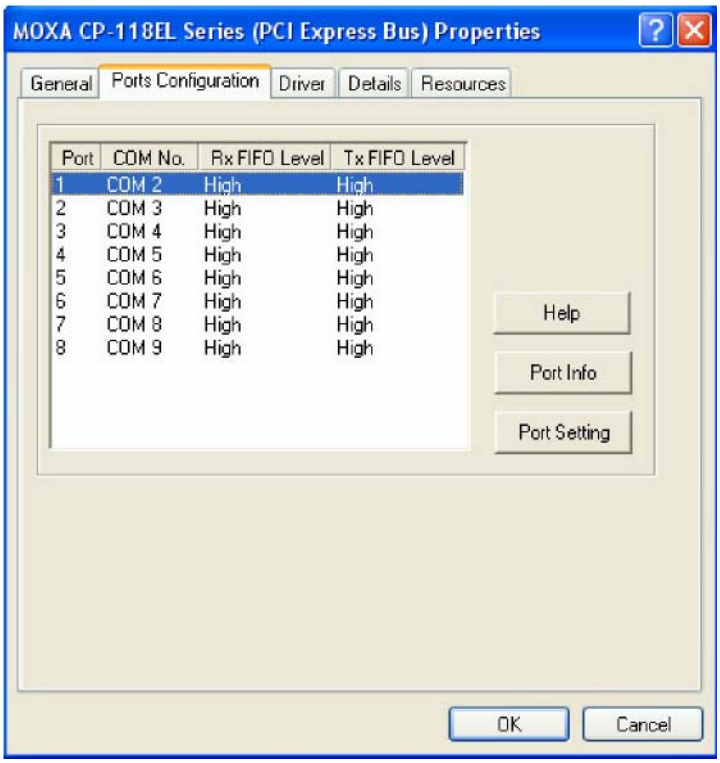
1. Click **Start → Settings → Control Panel → System**, select the **Hardware** tab, and then click **Device Manager**.

System Properties
System Restore
Automatic Updates
Remote
General
Computer Name
Hardware
Advanced
Device Manager
The Device Manager lists all the hardware devices installed on your computer. Use the Device Manager to change the properties of any device.
Device Manager
Drivers
Driving Signing lets you make sure that installed drivers are compatible with Windows. Windows Update lets you set up how Windows connects to Windows Update for drivers.
Driver Signing
Windows Update
Hardware Profiles
Hardware profiles provide a way for you to set up and store different hardware configurations.
Hardware Profiles
OK
Cancel
Apply

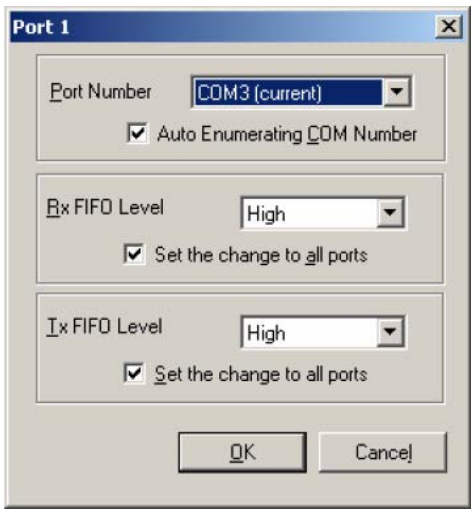
2. Expand the **Multi-port serial adapters** tab, right click **Moxa CP-118EL Series (PCI Express Bus)**, and then click **Properties** to open the board's configuration panel.




3. Click the port you would like to configure to highlight it, and then click **Port Setting**.



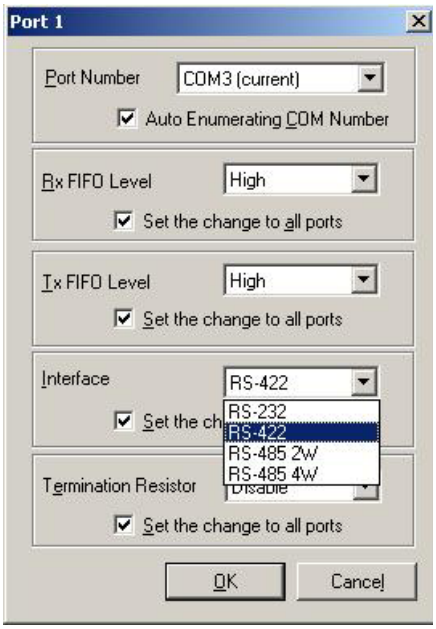
4. Select a COM number for the port from the **Port Number** pull-down list.
5. Select the **Auto Enumerating COM Number** option to map subsequent ports automatically. The port numbers will be assigned in sequence. For example, if COM 3 is assigned to Port 1, then COM 4 (if not already occupied) will be assigned to Port 2, etc.
6. Select an **Rx FIFO** Trigger from the **Rx FIFO Level** pull-down list. Rx FIFO trigger levels of **High**, **Middle**, and **Low** are available, with the default set to High (120 bytes). Select **Set the change to all ports** option to apply this Rx FIFO Trigger to all ports.
7. Select a **Tx FIFO Level** from the **Tx FIFO Level** pull-down list. Tx FIFO Levels of **High**, **Middle**, and **Low** are available, with the default set to High (128 bytes). Select **Set the change to all ports** option to apply the just defined Tx FIFO Size to all ports.

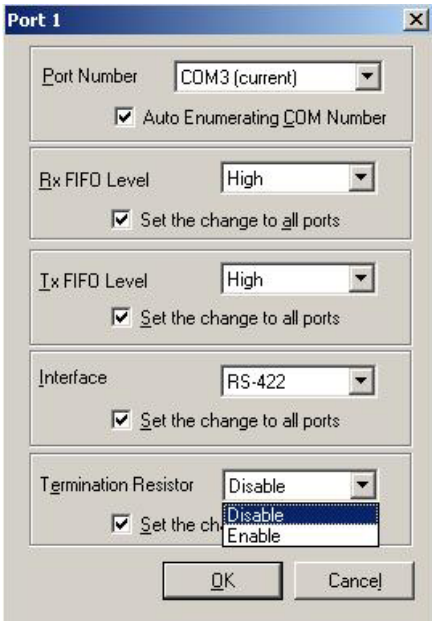



| | Tx FIFO | Rx FIFO |
|---|---|---|
| High | 128 | 120 |
| Middle | 64 | 60 |
| Low | 1 | 1 |

Unit: Bytes

8. If you use the CP-114EL, CP-114EL-I, CP-132EL, CP-132EL-I, select **Interface** (RS-232, RS-422, 2-wire RS-485, 4-wire RS-485) and **Termination Resistor** (120Ω, Enable or Disable) to configure. Take the CP-114EL for example. If you would like to configure as RS-422 and no Termination Resistor, please see figures below. However, if you use the CP-118EL, please refer to Chapter 2 to configure interface by DIP switch and Termination Resistor by jumper.



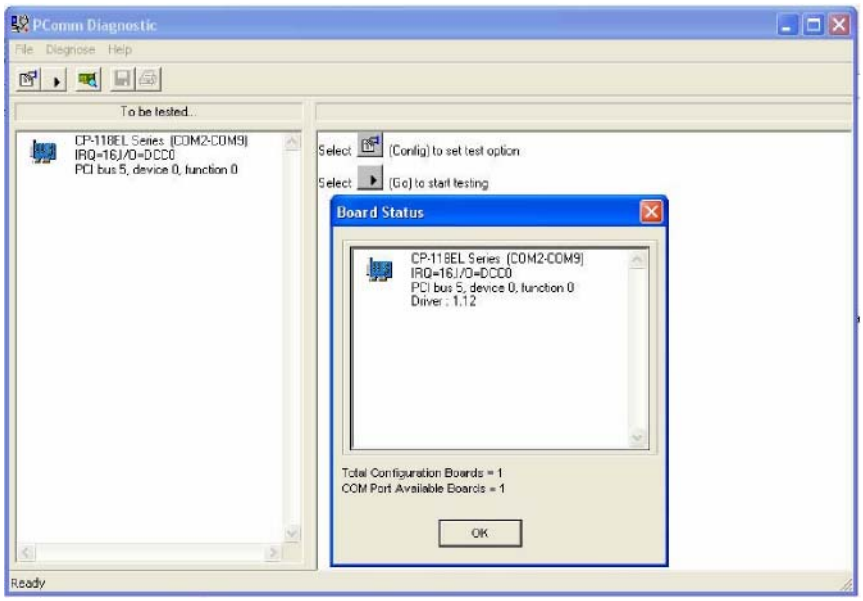




9. Click **OK** to save the port settings, and then click **OK** in the **Property** window to finish the port settings procedure.

## Using Moxa PComm Utility

The PComm Diagnostic program is a useful tool for checking the status of Moxa's multiport boards. The program can be used to test internal and external IRQ, TxD/RxD, UART, CTS/RTS, DTR/DSR, etc. Use this program to ensure that your Moxa boards and ports are working properly.

To start the program, click **Start → Programs → PComm Lite 2000 → PComm Diagnostic**.



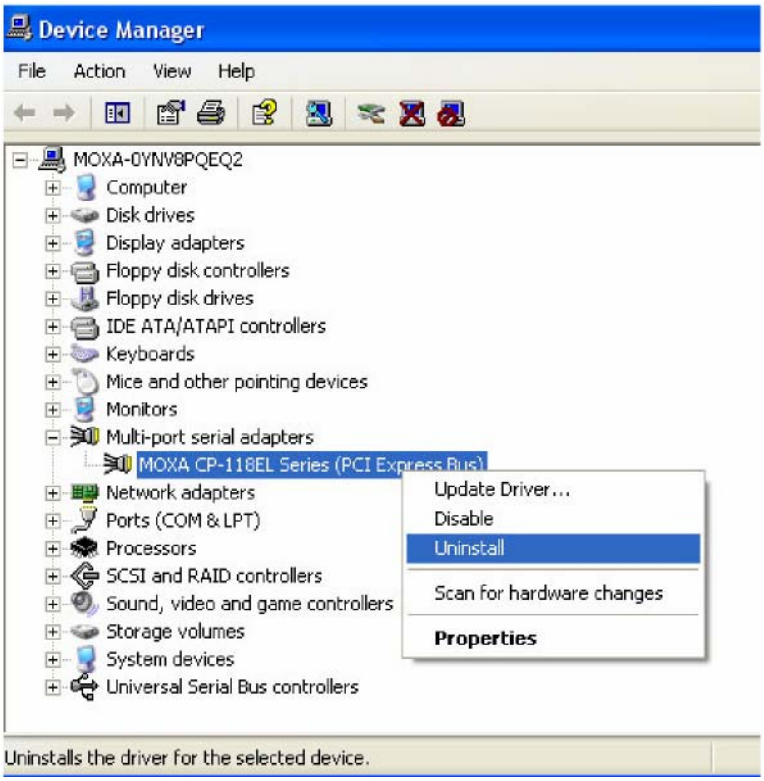

NOTE You can download the PComm Lite software for free from Moxa's website at www.moxa.com/support/free_downloads.htm.

## Using Event Log

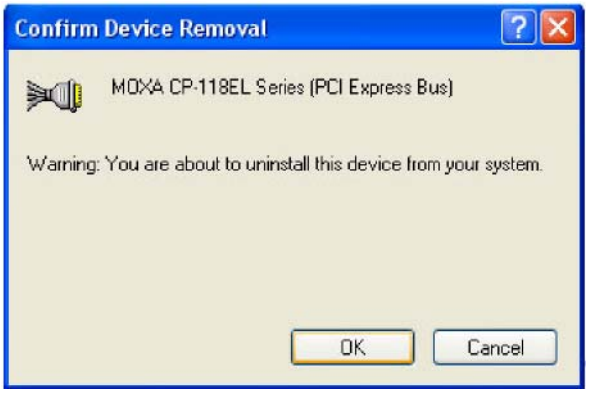
To use the **Event Log** to check the installation of your Moxa boards, click **Start → Settings → Control Panel → Administrative Tools → Event Viewer** to enter the Event Viewer utility. Look under the **System** category to find the latest information relevant to Moxa's drivers.

## Removing the Driver

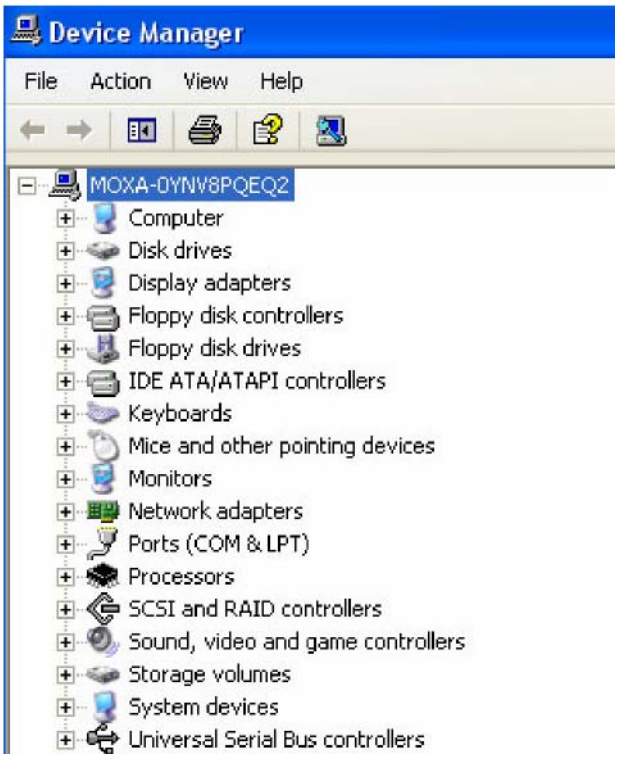
1. To uninstall the driver, click **Start → Settings → Control Panel → System**, select the **Hardware** tab, and then click **Device Manager**. Use the mouse to place the cursor over the CP-118EL Series board under **Multi-port serial adapters**, and then click the right mouse button. Select the **Uninstall...** option.




2. Click **OK** to proceed with uninstalling the board.


Confirm Device Removal
MOXA CP-118EL Series (PCI Express Bus)
Warning: You are about to uninstall this device from your system.
OK
Cancel

3. The **Device Manager** window refreshes automatically, showing that the driver and ports for the CP-118EL Series board have been removed.




## Windows 2000

In this section, we describe the installation procedure for Windows 2000.

Windows 2000 supports up to 256 serial ports, from COM1 to COM256. In order to utilize fully Windows 2000's multi-process and multi-thread advanced features, pure 32-bit Windows 2000 device drivers were developed for Moxa multiport boards. The drivers conform to the Win32 COMM API standard.

### Installing the Driver for the First Time

The following procedure shows how to install the CP-118EL driver for the first time under Windows 2000. First, make sure you have already plugged the board or boards into the system's PCI Express slot(s).

NOTE If you have already installed a CP-118EL or other Moxa PCI Express board in your computer, and you are installing additional boards, Windows 2000 will automatically detect and install the new board(s) the next time you boot up the computer. In this case, proceed directly to the next section, "Configuring the Ports," to configure the ports' serial transmission parameters.

1. After plugging the board into an expansion slot and powering on your PC, Windows 2000 will automatically detect the new board, and the **Found New Hardware** window will be displayed for a moment or two.

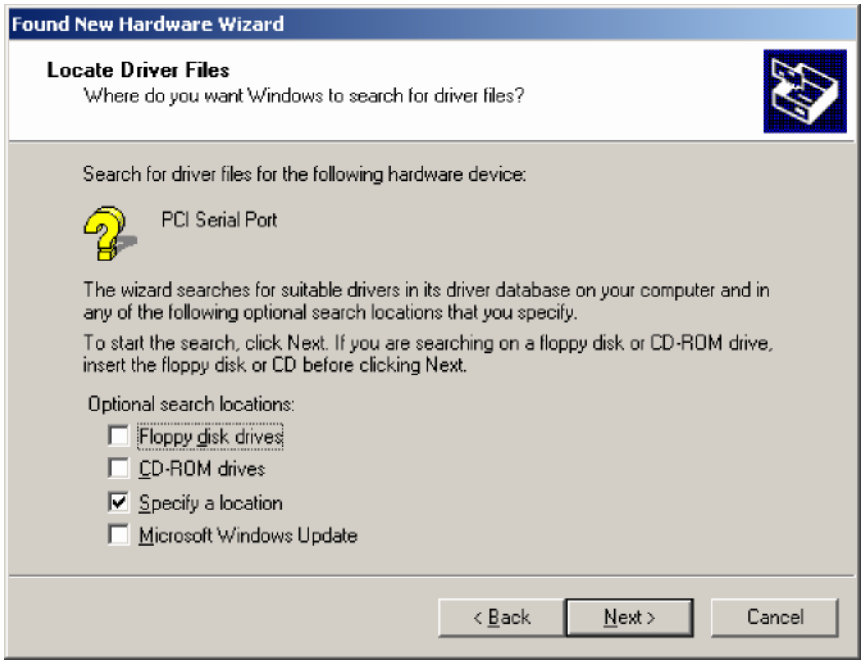
2. When the **Welcome to the Found New Hardware Wizard** window opens, click **Next** to continue.

Found New Hardware Wizard
Welcome to the Found New Hardware Wizard
This wizard helps you install a device driver for a hardware device.
To continue, click Next.
< Back
Next >
Cancel

3. Select Search **for a suitable driver for my device (recommended)**, and then click **Next** to continue.

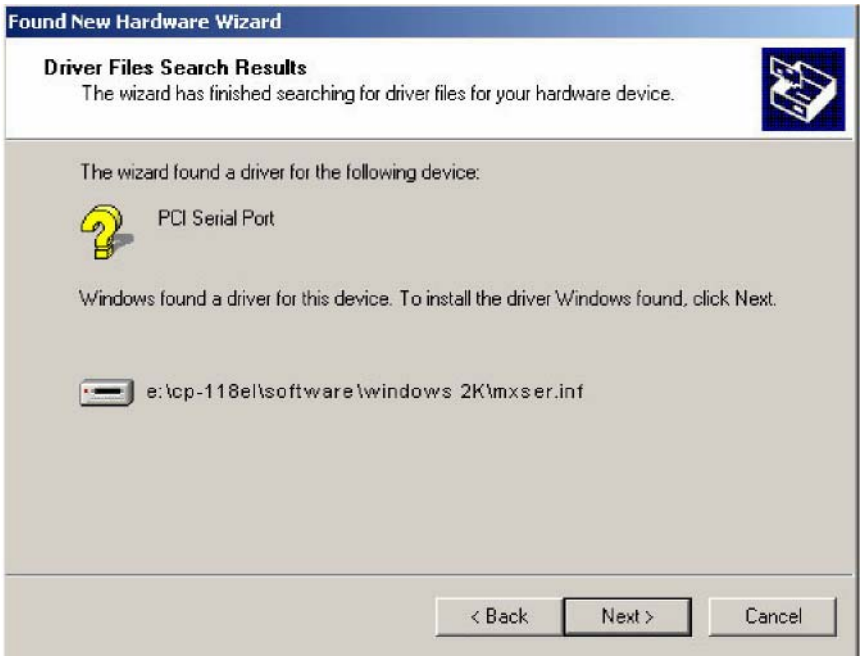
Found New Hardware Wizard
Install Hardware Device Drivers
A device driver is a software program that enables a hardware device to work with an operating system.
This wizard will complete the installation for this device:
PCI Serial Port
A device driver is a software program that makes a hardware device work. Windows needs driver files for your new device. To locate driver files and complete the installation click Next.
What do you want the wizard to do?
Search for a suitable driver for my device (recommended)
Display a list of the known drivers for this device so that I can choose a specific driver
< Back
Next >
Cancel

4. Select **Specify a location** and then click **Next** to continue.

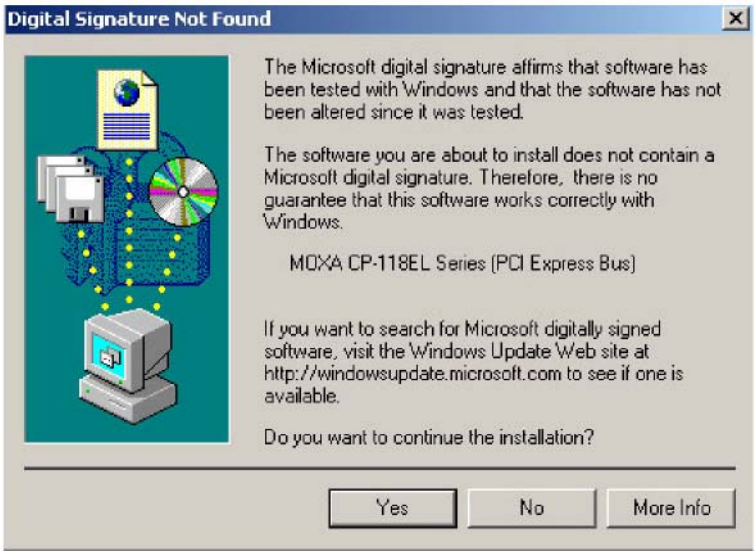

Found New Hardware Wizard
Locate Driver Files
Where do you want Windows to search for driver files?
Search for driver files for the following hardware device:
PCI Serial Port
The wizard searches for suitable drivers in its driver database on your computer and in any of the following optional search locations that you specify.
To start the search, click Next. If you are searching on a floppy disk or CD-ROM drive, insert the floppy disk or CD before clicking Next.
Optional search locations:
Floppy disk drives
CD-ROM drives
Specify a location
Microsoft Windows Update
< Back
Next >
Cancel

5. Navigate to the **\CP-118EL\Software\Windows 2K** folder on the software CD, and then click **OK** to continue.

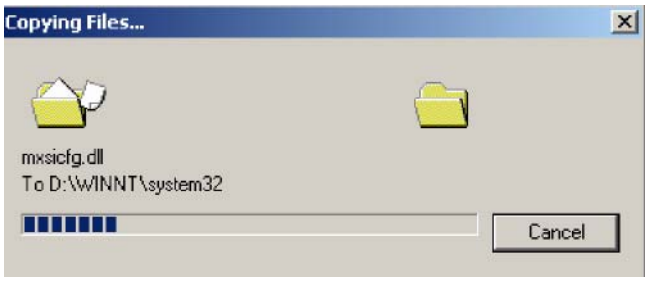
6. Click **Next** to copy the driver files to your system.


Found New Hardware Wizard
Driver Files Search Results
The wizard has finished searching for driver files for your hardware device.
The wizard found a driver for the following device:
PCI Serial Port
Windows found a driver for this device. To install the driver Windows found, click Next.
e:\cp-118el\software\windows 2K\mxser.inf
< Back
Next >
Cancel

7. The next window that opens cautions you that although this software has not passed Windows Logo testing, the driver has been tested and shown that it can support the Windows OS. Click **Yes** to proceed.


Digital Signature Not Found
The Microsoft digital signature affirms that software has been tested with Windows and that the software has not been altered since it was tested.
The software you are about to install does not contain a Microsoft digital signature. Therefore, there is no guarantee that this software works correctly with Windows.
MOXA CP-118EL Series (PCI Express Bus)
If you want to search for Microsoft digitally signed software, visit the Windows Update Web site at http://windowsupdate.microsoft.com to see if one is available.
Do you want to continue the installation?
Yes
No
More Info

8. Wait while the files are copied to your hard drive.



9. The next window shows the model number of the board, and indicates that Windows has completed the driver installation. Click **Finish** to continue with the rest of the installation procedure.

Found New Hardware Wizard
Completing the Found New Hardware Wizard
MOXA CP-118EL Series (PCI Express Bus)
Windows has finished installing the software for this device.
To close this wizard, click Finish.
< Back
Finish
Cancel

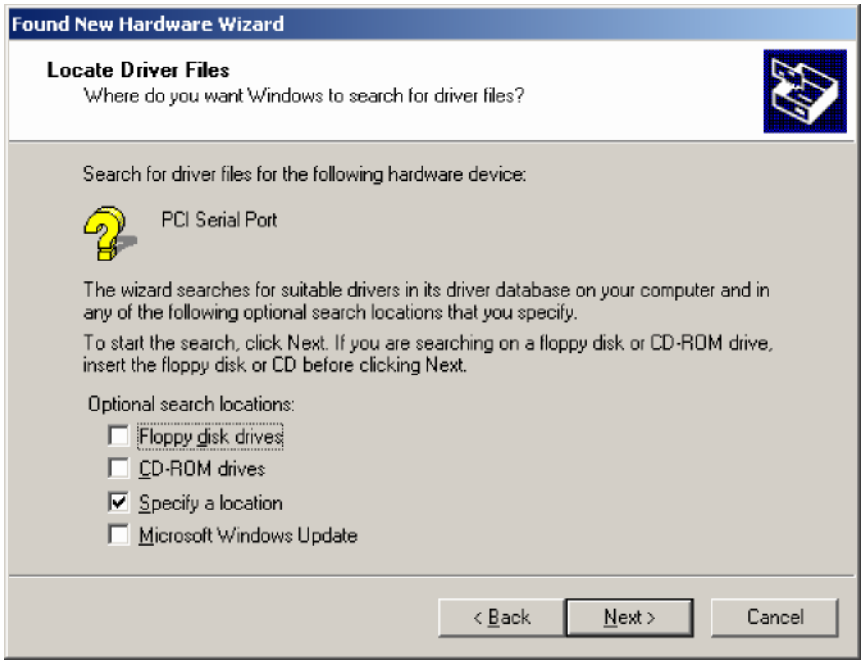
10. The **Found New Hardware** Wizard window will open to help you install the driver for Moxa Port 0. Click **Next** to continue.

Found New Hardware Wizard
Welcome to the Found New Hardware Wizard
This wizard helps you install a device driver for a hardware device.
To continue, click Next.
< Back
Next >
Cancel

11. Select **Search for a suitable driver for my device (recommended)**, and then click **Next** to continue.

Found New Hardware Wizard
Install Hardware Device Drivers
A device driver is a software program that enables a hardware device to work with an operating system.
This wizard will complete the installation for this device:
PCI Serial Port
A device driver is a software program that makes a hardware device work. Windows needs driver files for your new device. To locate driver files and complete the installation click Next.
What do you want the wizard to do?
Search for a suitable driver for my device (recommended)
Display a list of the known drivers for this device so that I can choose a specific driver
< Back
Next >
Cancel

12. Select **Specify a location** and then click **Next** to continue.

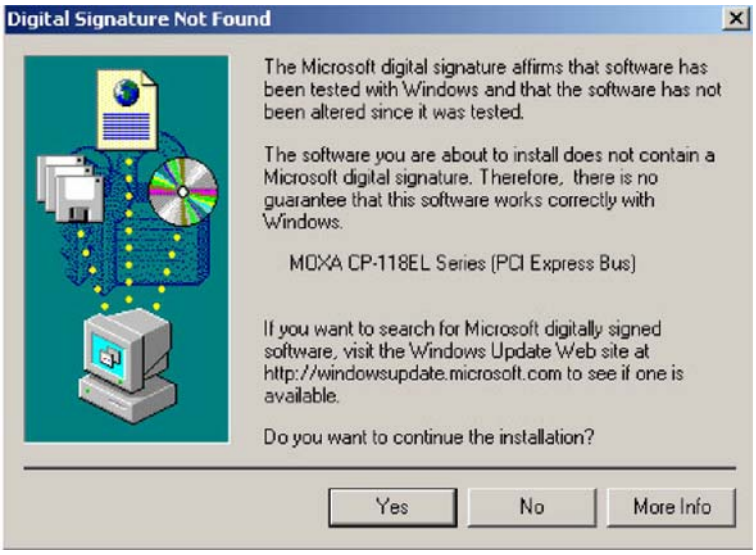

Found New Hardware Wizard
Locate Driver Files
Where do you want Windows to search for driver files?
Search for driver files for the following hardware device:
PCI Serial Port
The wizard searches for suitable drivers in its driver database on your computer and in any of the following optional search locations that you specify.
To start the search, click Next. If you are searching on a floppy disk or CD-ROM drive, insert the floppy disk or CD before clicking Next.
Optional search locations:
Floppy disk drives
CD-ROM drives
Specify a location
Microsoft Windows Update
< Back
Next >
Cancel

13. Navigate to the **\CP-118EL\Software\Windows 2K** folder on the software CD, and then click **OK** to continue.

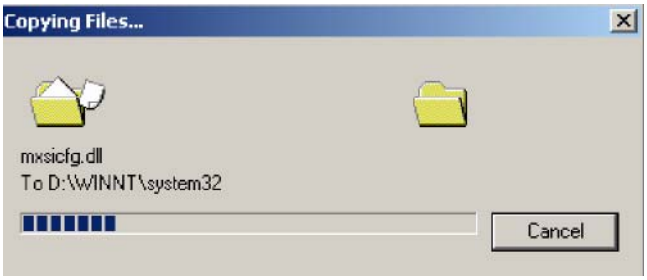
14. Wait while the installation wizard searches.

Found New Hardware Wizard
Driver Files Search Results
The wizard has finished searching for driver files for your hardware device.
The wizard found a driver for the following device:
MOXA communication port
Windows found a driver for this device. To install the driver Windows found, click Next.
e:\cp-118el\software\windows 2k\mxsport.inf
The wizard also found other drivers that are suitable for this device. To view a list of these drivers or install one of these drivers, select the following check box, and then click Next.
Install one of the other drivers
< Back
Next >
Cancel

15. The next window that opens cautions you that although this software has not passed Windows Logo testing, the driver has been tested and shown that it can support the Windows OS. Click **Yes** to proceed.


Digital Signature Not Found
The Microsoft digital signature affirms that software has been tested with Windows and that the software has not been altered since it was tested.
The software you are about to install does not contain a Microsoft digital signature. Therefore, there is no guarantee that this software works correctly with Windows.
MOXA CP-118EL Series (PCI Express Bus)
If you want to search for Microsoft digitally signed software, visit the Windows Update Web site at http://windowsupdate.microsoft.com to see if one is available.
Do you want to continue the installation?
Yes
No
More Info

16. Wait while the files are copied to your hard drive.



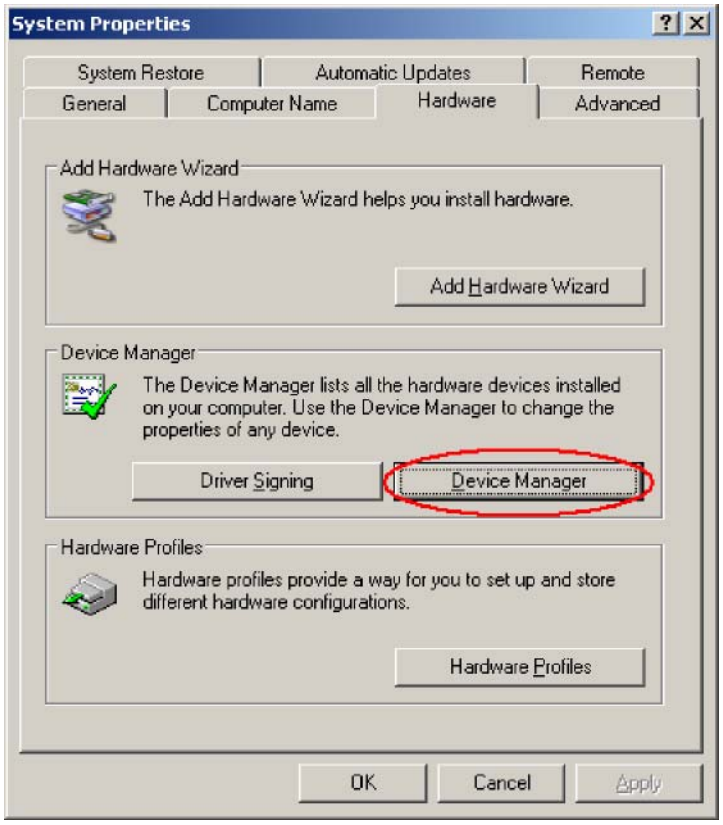
17. After all files have been copied to the system, the **Completing the Found New Hardware Wizard** window will open to indicate that it has finished installing **Port 0**. Click **Finish** to proceed with the rest of the installation.

Found New Hardware Wizard
Completing the Found New Hardware Wizard
MOXA Port 0
Windows has finished installing the software for this device.
To close this wizard, click Finish.
< Back
Finish
Cancel

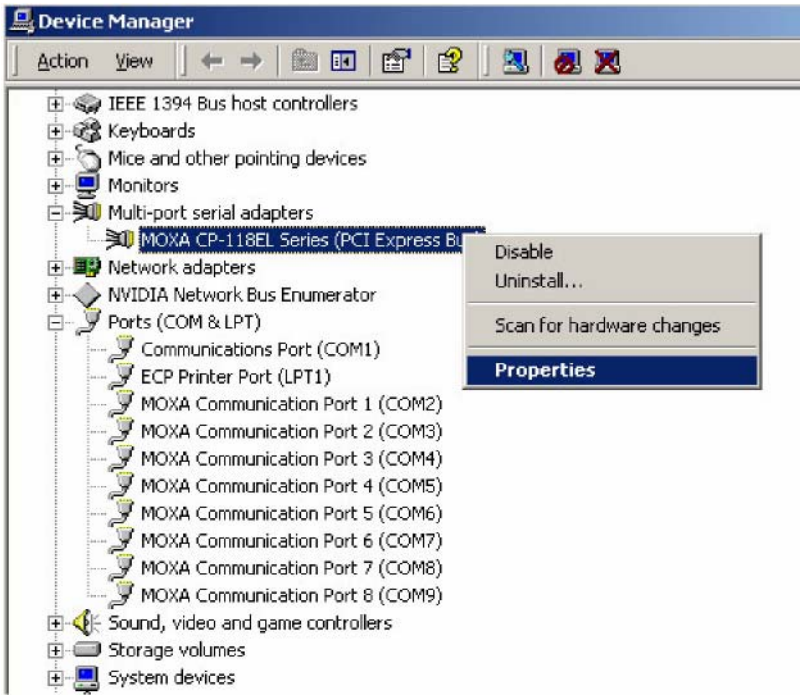
## Configuring the Ports

After the driver has been installed, use Device Manager to configure the CP-118EL serial ports.

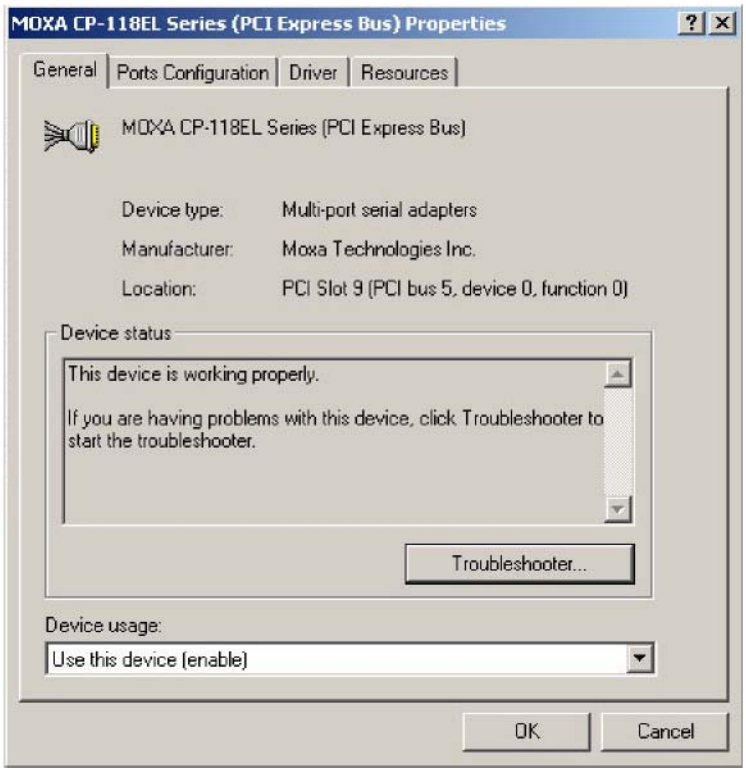
1. Click **Start → Settings → Control Panel → System**, select the **Hardware** tab, and then click **Device Manager**.



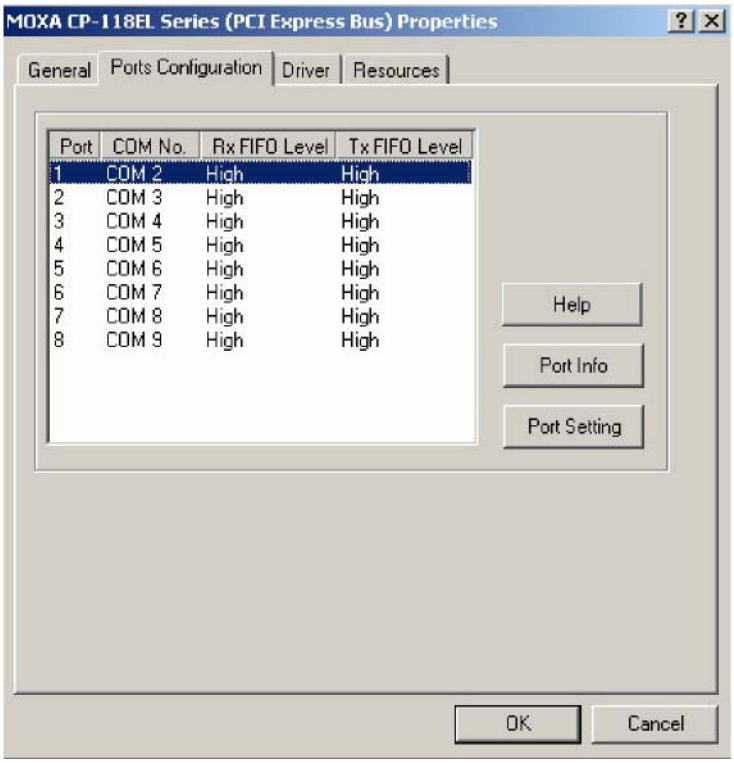
2. Expand the **Multi-port serial adapters** tab, right click **Moxa CP-118EL Series (PCI Express Bus)**, and then click **Properties** to open the board's configuration panel.



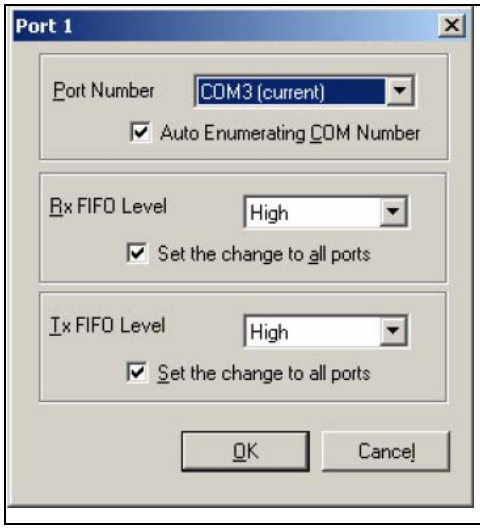

3. Basic information about the board is displayed on the **General** page. Click the **Ports Configuration** tab to configure the board's serial ports.


MOXA CP-118EL Series (PCI Express Bus) Properties
General
Ports Configuration
Driver
Resources
MOXA CP-118EL Series (PCI Express Bus)
Device type: Multi-port serial adapters
Manufacturer: Moxa Technologies Inc.
Location: PCI Slot 9 (PCI bus 5, device 0, function 0)
Device status
This device is working properly.
If you are having problems with this device, click Troubleshooter to start the troubleshooter.
Troubleshooter...
Device usage:
Use this device (enable)
OK
Cancel

4. Click the port you would like to configure to highlight it, and then click **Port Setting**.



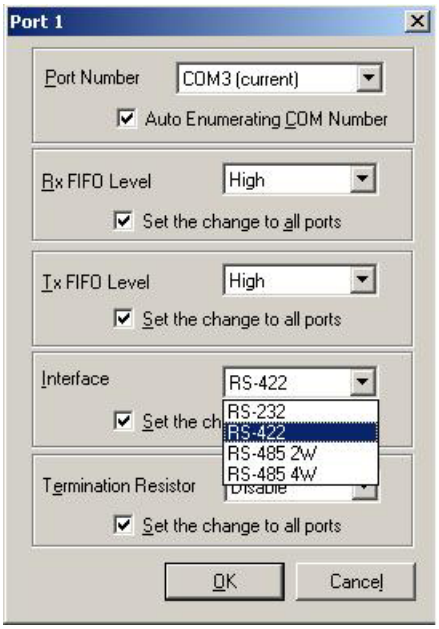

5. Select a COM number for the port from the **Port Number** pull-down list.
6. Select the **Auto Enumerating COM Number** option to map subsequent ports automatically. The port numbers will be assigned in sequence. For example, if COM 3 is assigned to Port 1, then COM 4 (if not already occupied) will be assigned to Port 2, etc.
7. Select an **Rx FIFO Trigger** from the **Rx FIFO Level** pull-down list. Rx FIFO trigger levels of **High, Middle,** and **Low** are available, with the default set to High (120 bytes). Select Set **the change to all ports** option to apply this Rx FIFO Trigger to all ports.
8. Select a **Tx FIFO Level** from the **Tx FIFO Level** pull-down list. Tx FIFO Levels of **High**, **Middle**, and **Low** are available, with the default set to High (128 bytes). Select **Set the change to all ports** option to apply the just defined Tx FIFO Size to all ports.

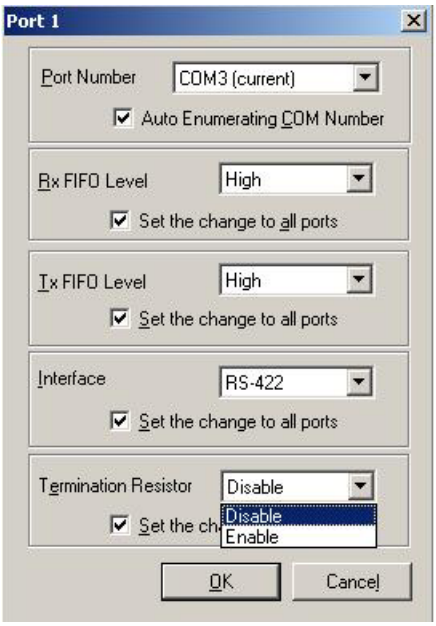



| | Tx FIFO | Rx FIFO |
|---|---|---|
| High | 128 | 120 |
| Middle | 64 | 60 |
| Low | 1 | 1 |

Unit: Bytes

9. If you use the CP-114EL, CP-114EL-I, CP-132EL, CP-132EL-I, select **Interface** (RS-232, RS-422, 2-wire RS-485, 4-wire RS-485) and **Termination Resistor** (120Ω, Enable or Disable) to configure. Take the CP-114EL for example. If you would like to configure as RS-422 and no Termination Resistor, please see figures below. However, if you use the CP-118EL, please refer to Chapter 2 to configure interface by DIP switch and Termination Resistor by jumper.



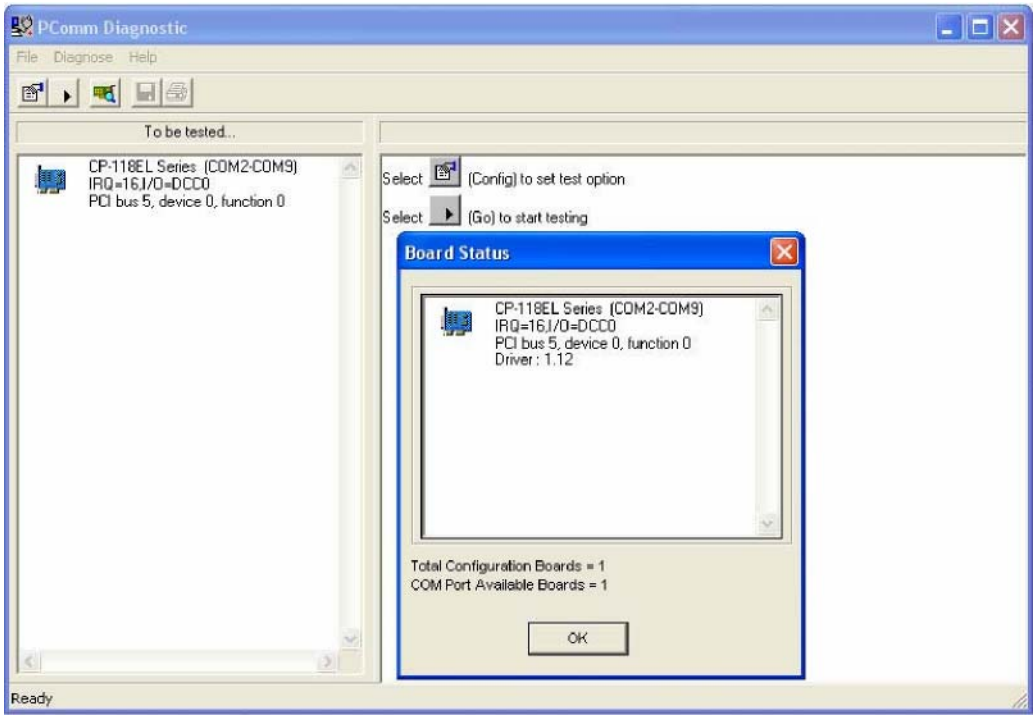




10. Click **OK** to save the port settings, and then click **OK** in the **Property** window to finish the port settings procedure.

## Using Moxa PComm Utility

The PComm Diagnostic program is a useful tool for checking the status of Moxa's multiport boards. The program can be used to test internal and external IRQ, TxD/RxD, UART, CTS/RTS, DTR/DSR, etc. Use this program to ensure that your Moxa boards and ports are working properly.

To start the program, click **Start → Programs → PComm Lite 2000 → PComm Diagnostic**.



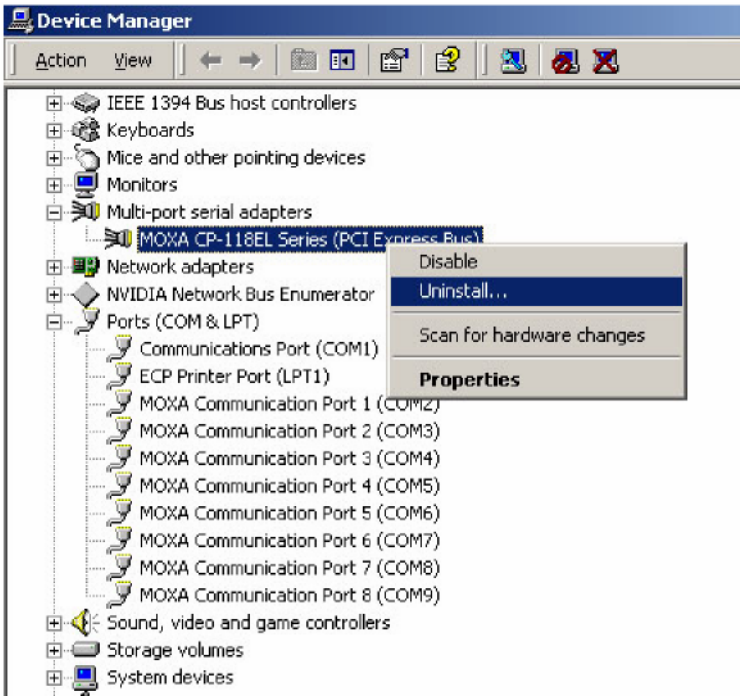

NOTE You can download the PComm Lite software for free from Moxa's website at www.moxa.com/support/free_downloads.htm.

## Using Event Log

To use the **Event Log** to check the installation of your Moxa boards, click **Start → Settings → Control Panel → Administrative Tools → Event Viewer** to enter the Event Viewer utility. Look under the **System** category to find the latest information relevant to Moxa's drivers.

## Removing the Driver

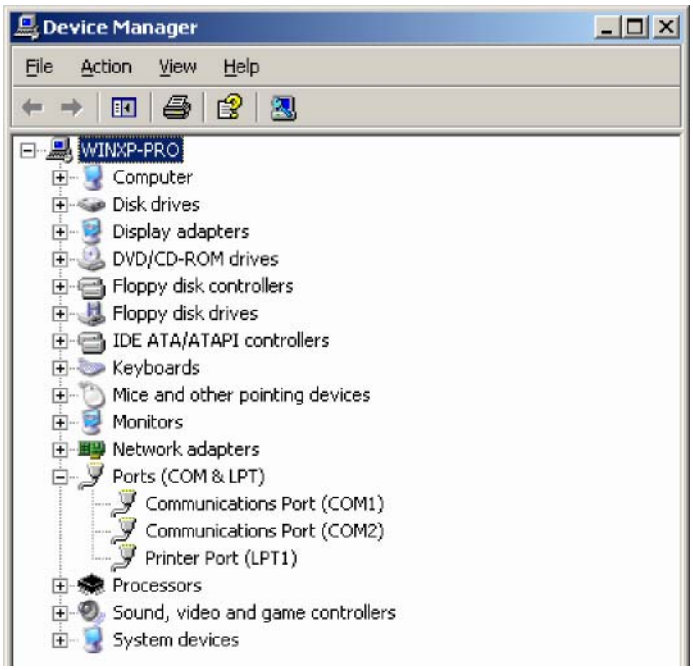
1. To uninstall the driver, click **Start → Settings → Control Panel → System**, select the **Hardware** tab, and then click **Device Manager**. Use the mouse to place the cursor over the CP-118EL Series board under **Multi-port serial adapters**, and then click the right mouse button. Select the **Uninstall...** option.




2. Click **OK** to proceed with uninstalling the board.

Confirm Device Removal
MOXA CP-118EL Series (PCI Express Bus)
Warning: You are about to uninstall this device from your system.
OK
Cancel

3. The **Device Manager** window refreshes automatically, showing that the driver and ports for the CP-118EL Series board have been removed.




# Non-Windows Drivers

Drivers are provided for DOS, Linux, and SCO.

## DOS

Moxa DOS API-232 is a software package that assists users in developing new programs, or debugging existing programs for serial communications. This section explains how to install the package, how to set up the driver, and how to load or unload the driver.

Moxa provides drivers that allow you to use the following serial board products under DOS:

- **PCI Express Boards:** CP-118EL, CP-168EL, CP-104EL.
- **Universal PCI Boards:** CP-118U, CP-168U, CP-104UL, CP-104JU, CP-102U, CP-102UL, CP-134U, CP-134U-I, CP-132UL, CP-132UL-I V2(CP-132U-I V1)
- **PCI Boards:** C168H/PCI, C104H/PCI, C104HS/PCI, CP-114, CP-114I, CP-114S, CP-114IS, CP-132, CP-132I, CP-132S, CP-132IS
- **ISA Boards:** C168H, C168HS, C168P, C104H, C104HS, C104P, CI-104J, CI-104JS, CI-134, CI-134I, CI-134IS, CI-132, CI-132I, CI-132IS
- **cPCI Boards:** CT-114I

WARNING

If you are using a Serial ATA HDD under DOS, the installation process will also hang. In this case, change your HDD to IDE drive.

NOTE The following procedure shows how to install the CP-168EL driver under DOS.

## Installing the Driver

1. Run the installation program, **DOSINST.EXE** from the **\Software\DOS** folder on the Documentation and Software CD. Specify the target API-232 directory (e.g. C:\Moxa) to which the driver will be copied. Press F2 to start the installation.

2. After the installation is complete, a window will open to ask if you want to run **SETUP.EXE**. Press **Y** to run the program.

Installation complete, 57 files copied.
After leaving this program, you have to run
C:\MOXA\BIN\SETUP.EXE
program to setup board & driver initial values.
Do you want to run SETUP.EXE now ?(Y/N)

## Setting up the Driver

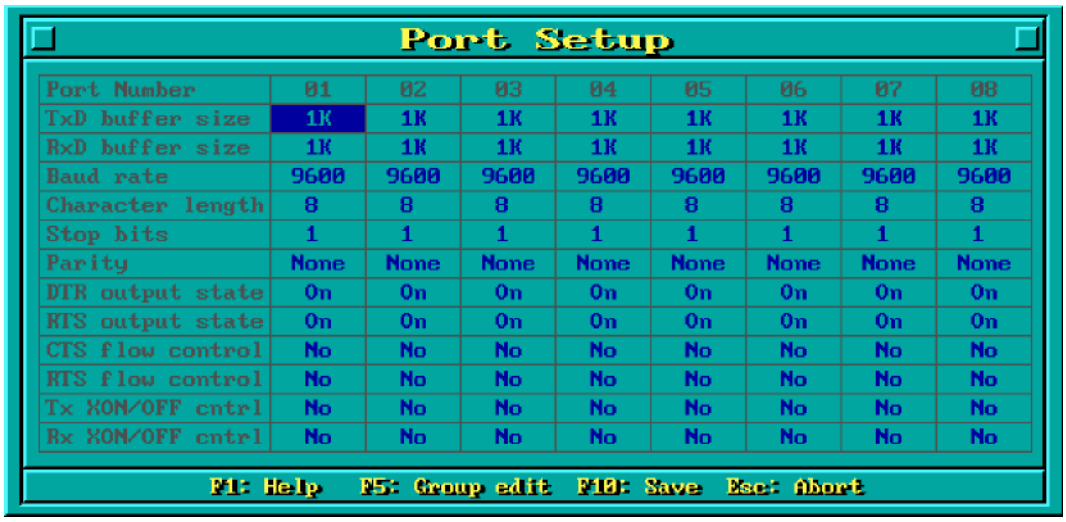
This section covers some of the setup program's most frequently used functions. For complete details, press F1 to open the on-line help file.

1. Run **BIN\SETUP.EXE**.
2. Press **Enter** to select the model name of the Moxa board you are installing.

3. A window will open displaying basic configuration information for all boards of this type currently installed in the system. Press **PgDn** to configure the port settings.

Board Setup
Board no. Type Port no. I/O Address IRQ Bus/Dev no.
1 CP-168EL Series 1-8 B800 5 3 / 8
2 NONE
3 NONE
4 NONE
F10: Save & Exit Esc: Exit PgDn: Port setup

4. You may enter or modify the settings of each port at this stage. The values displayed first are the port's initial values that were set up when the driver was installed.


Port Setup
Port Number 01 02 03 04 05 06 07 08
TxD buffer size 1K 1K 1K 1K 1K 1K 1K 1K
RxD buffer size 1K 1K 1K 1K 1K 1K 1K 1K
Baud rate 9600 9600 9600 9600 9600 9600 9600 9600
Character length 8 8 8 8 8 8 8 8
Stop bits 1 1 1 1 1 1 1 1
Parity None None None None None None None None
DTR output state On On On On On On On On
RTS output state On On On On On On On On
CTS flow control No No No No No No No No
RTS flow control No No No No No No No No
Tx XON/OFF cntrl No No No No No No No No
Rx XON/OFF cntrl No No No No No No No No
F1: Help F5: Group edit F10: Save Esc: Abort

5. Press **F10** to save the changes and exit the SETUP program.

## Legends

In this section, we explain the meaning of some of the fields and functions.

### Port number

This is the ID of the port. Application software uses port number (ID) when referring to a port. You can set the port numbers to any number between 0 and 255 (inclusive). However, you must ensure that you assign each port a unique port number. If you are developing your own application software, then you may want to select port numbers that take into consideration the structure of the program.

### TxD buffer size

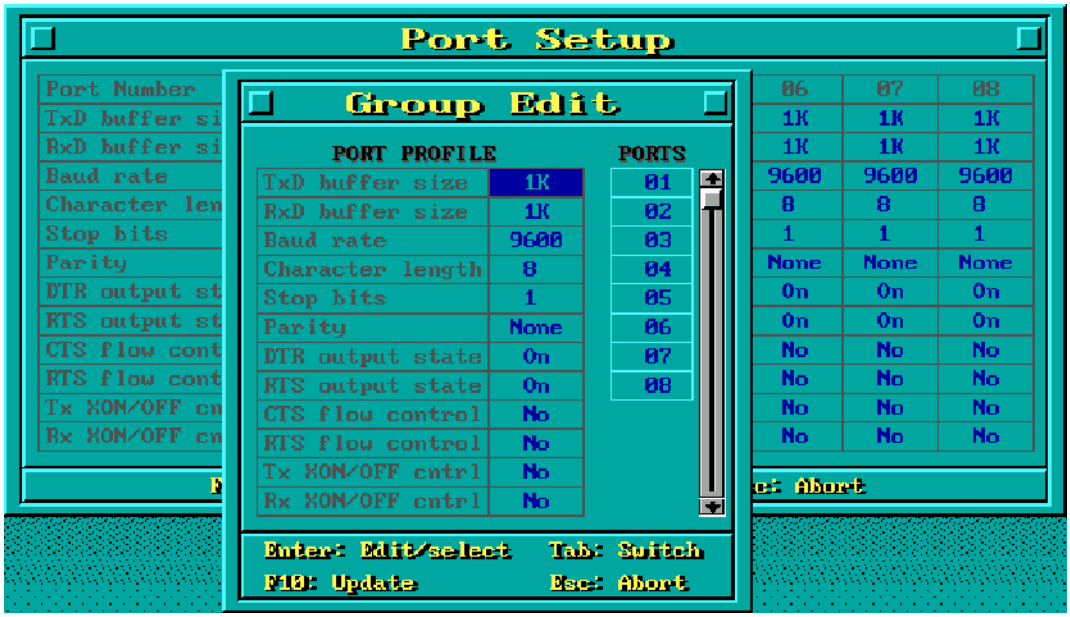
The TxD buffer is the transmission (output) buffer allocated by the system for each port.

### RxD buffer size

The RxD buffer is the receiving (input) buffer allocated by the system for each port.

### F5 Group Edit

This convenient function allows you to edit the configuration of several ports at one time as a group.




### Loading the Driver

After completing the setup procedure, run **BIN\DP-DRV.EXE** from the DOS prompt to load the driver. The driver will automatically detect the boards that have already been installed. If one or more boards are detected, you will see a message similar to the following:

*Smartio/Industio Family DOS driver Version 1.7*
*Setup driver ...*
*CP-168EL series (Bus= x ,Dev=y) : OK!*
*Device driver setup O.K.*

This indicates that the CP-168EL Series driver has been installed properly. At this point, you may execute applications that support API-232 functions, or start developing applications using the API-232 library.

### Unloading the Driver

To unload (release) the driver from memory, type **DP-DRV/Q** at the DOS prompt and then press **Enter**.

## Linux (32-bit/64-bit)

Moxa provides drivers that allow you to use the following serial board products under Linux.

- **PCI Express Boards:**
  CP-118EL,CP-168EL,CP-104EL,CP-102E,CP-102EL,CP-132EL,CP-132EL-I,CP-114EL,CP-114EL-I

NOTE The following procedure shows how to install the CP-114EL driver under Linux.

Execute the following commands from the Linux prompt:

1. 
```
#mount /dev/cdrom /mnt/cdrom
#cd /
#mkdir moxa
#cd moxa
#cp /mnt/cdrom/<driver directory>/driv_linux_smart_vx.x_build_yymmddhh.tgz.
#tar –xzvf driv_linux_smart_vx.x_build_yymmddhh.tgz.
```
2. 
```
#cd mxser
#make clean; make install
```
3. 
```
#cd /moxa/mxser/driver
#./msmkod
```
4. 
```
#modprobe mxupcie
```
5. For CP-132EL, CP-132EL-I, CP-114EL, CP-114EL-I, use the Moxa Port Configuration Tool to set Interface and Termination Resistor for the MUE series. The MUE series includes CP-102E, CP-102EL, CP-132EL, CP-132EL-I, CP-114EL and CP-114EL-I.

   Usage: muestty <operation> device

   Device: The MUE series device node

| | | |
|---|---|---|
| Operation: | -h | Help |
| | -g | Get interface and terminator type |
| | -i intf | Set interface type with options below |
| | -t value | Set termination resistor with options below |
| intf | RS232 | RS-232 mode |
| | RS422 | RS-422 mode |
| | RS4852W | RS-485 2-wire mode |
| | RS4854W | RS-485 4-wire mode |
| value | NONTERM | Non termination resistor |
| | 120TERM | 120ohm termination resistor |

   For example:

   To set the MUE interface
   # muestty –i RS422 /dev/ttyMUE2

   To set the MUE termination resistor
   # muestty –t 120TERM /dev/ttyMUE2

6. Use the Moxa diagnostics utility to verify the driver status:
```
#cd /moxa/mxser/utility/diag
#./msdiag
```
7. Use the Moxa terminal utility to test the tty ports:
```
#cd /moxa/mxser/utility/term
#./msterm
```

## SCO

Moxa provides drivers that allow you to use the following serial board products under SCO Unix.

- **PCI Express Boards:** CP-118EL,CP-168EL, CP-104EL.
- **Universal PCI Boards:** CP-118U, CP-168U, CP-104UL, CP-104JU, CP-102U, CP-102UL
- **PCI Boards:** C168H/PCI, C104H/PCI, C104HS/PCI
- **ISA Boards:** C168H, C168HS, C168P, C104H, C104HS, C104P, CI-104J, CI-104JS

Follow the steps given in this section to install the SCO driver. Note that the SCO driver provided by Moxa only supports RS-232. Consequently, the SCO driver will only work with CP-118U ports that are configured for RS-232. Moxa provides drivers for the following versions of SCO:

- **SCO OpenServer**
- **SCO UnixWare 7**
- **SCO UnixWare 2.1**

The following steps are for installing the driver under SCO OpenServer. The installation procedures for SCO UnixWare 7 and SCO UnixWare 2.1 are similar.

1. Copy the driver file .tar to your host.
2. #tar xvf <driver tar file>
   /tmp/moxa/mxintall
   /tmp/moxa/sco.tar
3. # cd/tmp/mxinstall
   # ./mxinstall
4. The window shown below will open next. Press any key to continue.

```
==========================================================================
Copyright© 2008 Moxa Inc.
All Rights Reserved.

Moxa Smartio Family Device Driver Installation (Ver. 1.8)
==========================================================================

For SCO UNIX System V/386 Release 3.2


Tar files, please wait.....O.K.

Press any key to continue
```

5. The **Basic Configuration** window will open next. You can install up to four Moxa Smartio Multiport Serial Boards under SCO Unix/SCO Open Server.

Moxa Smartio Family Installation Utility (Ver 1.8)

| Smartio Family Basic Configuration | | | | |
|---|---|---|---|---|
| Board No. | Board Type | I/O Address | Interrupt | Bus/Dev No. |
| 1 | None | ---------- | ---------- | ---------- |
| 2 | None | ---------- | ---------- | ---------- |
| 3 | None | ---------- | ---------- | ---------- |
| 4 | None | ---------- | ---------- | ---------- |
| PgDn: getty Setting Esc: Exit<br>Enter: Confirm Input Value Tab: Change Item | | | | |

6. Press Enter to select the Moxa Multiport Serial Board you installed. For example, select "CP-118EL" and then press **Enter**.

| None |
|---|
| C168 ISA Series |
| C104 ISA Series |
| C168 PCI Series |
| C104 PCI Series |
| CI-104J Series |
| CP-102 Series |
| CP-104U Series |
| CP-168U Series |
| CP-104JU Series |
| CP-118U Series |
| CP-102UL Series |
| CP-102U Series |
| CP-118EL Series |
| CP-168EL Series |
| CP-104EL Series |

7. The board's basic information, such as I/O address, Bus No., and Device No., will be shown next. The SCO system will assign the resources to the PCI Express board you selected.

| PCI Express Boards Selecting | | | |
|---|---|---|---|
| 1 | I/O Addr= | AC00, BusNO=2 | DevNo=13 |
| Enter: Select | | | ESC: Exit |

8. Press **Enter** to return to the main screen.

Smartio Family Installation Utility (Ver 1.8)

| Smartio Family Basic Configuration | | | | |
|---|---|---|---|---|
| Board No. | Board Type | I/O Address | Interrupt | Bus/Dev No. |
| 1 | CP-118EL | AC00 | 5 | **2/13** |
| 2 | None | ---------- | ---------- | ---------- |
| 3 | None | ---------- | ---------- | ---------- |
| 4 | None | ---------- | ---------- | ---------- |
| PgDn: getty Setting Esc: Exit<br>Enter: Confirm Input Value Tab: Change Item | | | | |

9. Press **Esc** to save the configuration and exit.

```
Save configuration changes? (Y/N)
```

10. The driver files will be copied to the SCO system. Press any key to continue.

```
----------[Message] ----------
Copying driver files and configuring system. Please wait….
Press any key to continue! _
```

11. Press **Y** to rebuild the system.

```
----------[Message] ----------
Do you want to rebuild the system? (y/n)_
```

12. The following window will open next.

```
----------[Message] ----------
Do you want to rebuild the system? (y/n)_
Rebuilding kernel. Please wait….
```

13. After the system is rebuilt, the system will return to shell command. And you should manually reboot your system then you can begin to use your Moxa Smartio Multiport Serial Board.

```
----------[Message] ----------
Do you want to rebuild the system? (y/n)_
Rebuilding kernel. Please wait….
Rebuilding kernel completed.
Please remember to manually reboot your system later.
Press any key to continue. _
```

# Windows CE 5.0

In this section, we explain how to install Moxa PCI Express boards under WinCE 5.0. These instructions are intended for users who are familiar with the Windows CE Platform Builder 5.0 Toolkit, and would like to install one or more Moxa Tech products. Here, we only give the step-by-step installation instructions for the development environment. You will need to download the image file to the target host yourself.

The WinCE 5.0 driver for the Moxa PCI Express Multiport Serial Module supports the following products:

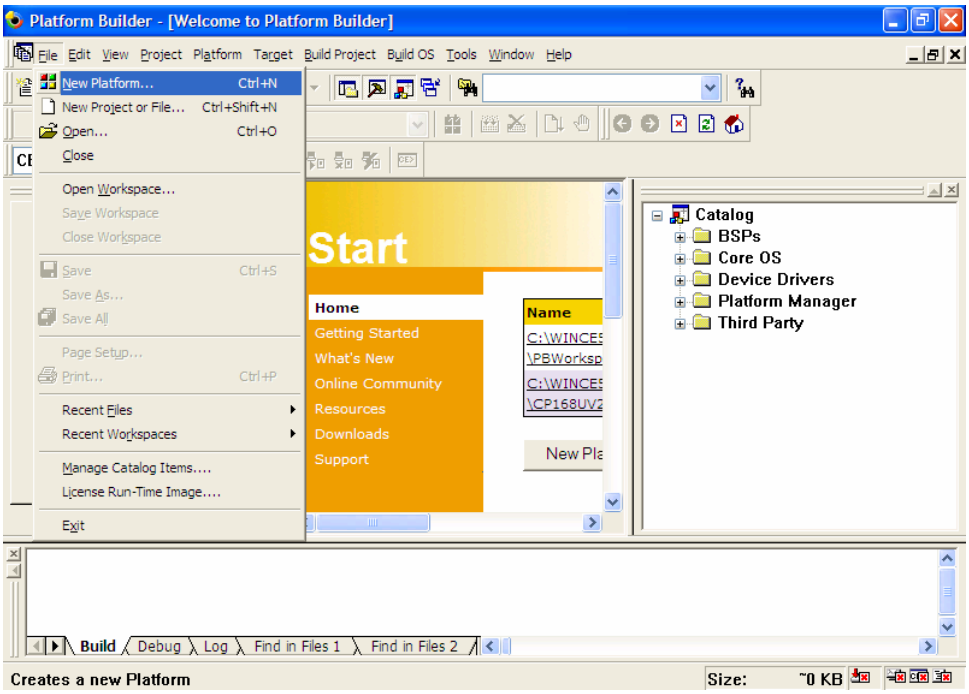
- PCI Express: CP-118EL, CP-168EL and CP-104EL

The CP-104EL board is used to illustrate the installation procedure.

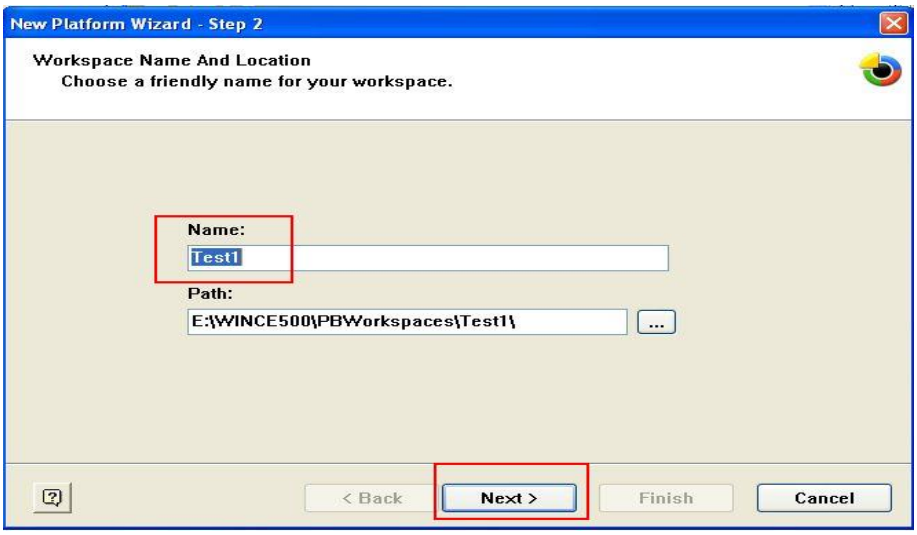
## Installing the driver

The following procedure explains how to install the CP-104EL multiport serial module driver under WinCE.

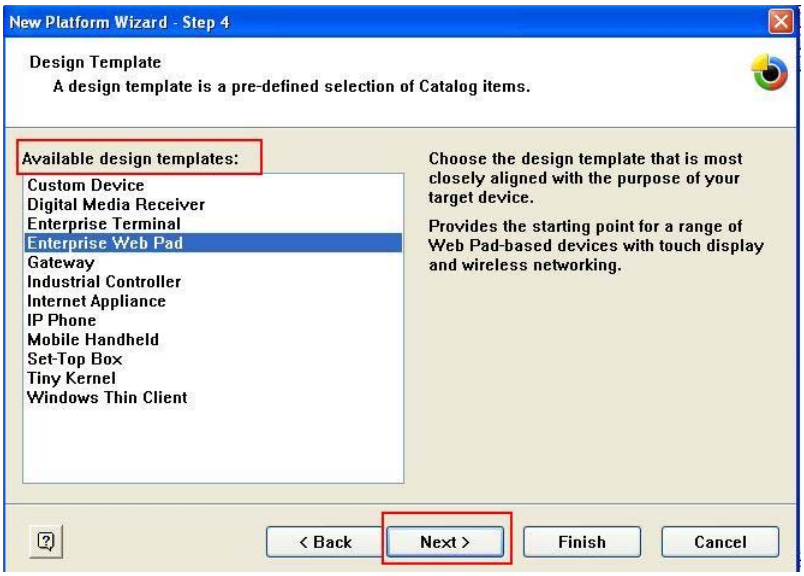
1. Obtain a copy of Moxa Tech WinCE 5.0 driver package and extract it to your computer. Double click the Install package to copy the **Mxser** folder to %WINCEROOT%\PLATFORM\ automatically, and import the supported Moxa Tech products into the **Folder**.
2. Start WinCE Platform Builder, select **File**, and open **New Platform**.

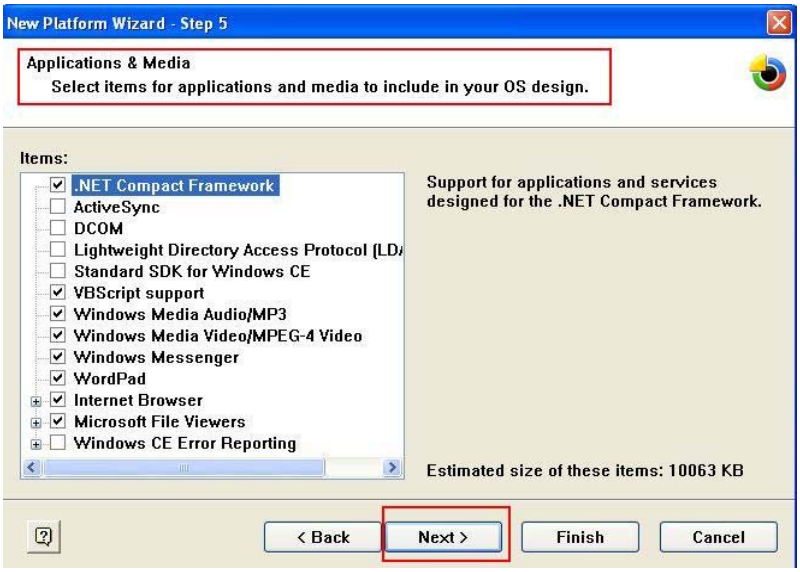


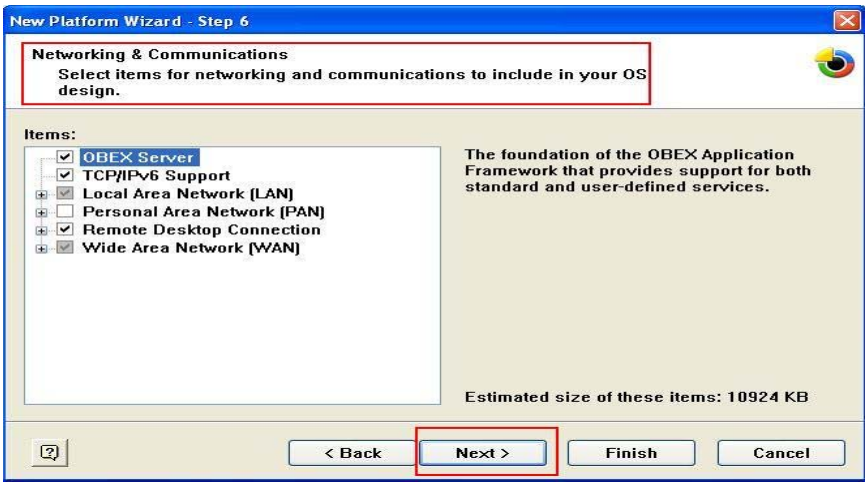
3. Enter a Name for Workspace and press **Next**.

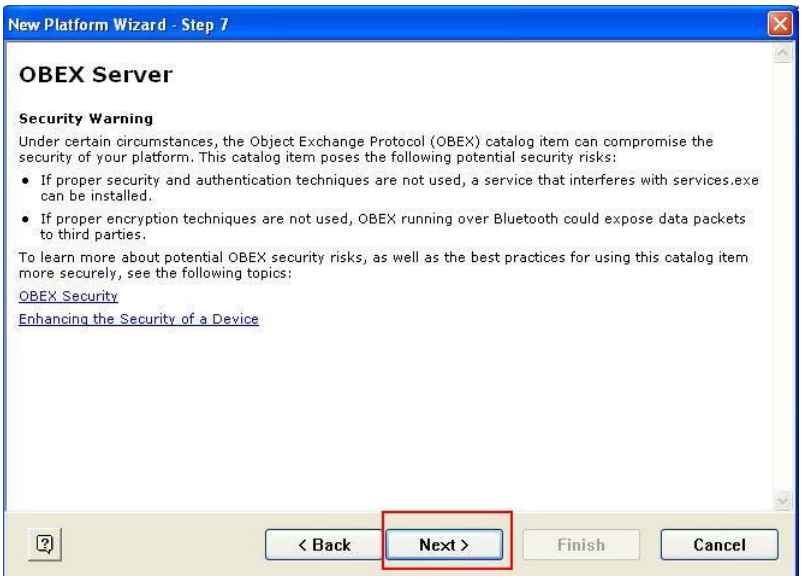



4. When you see **Board Support Packages, Design Template, Applications & Media, Networking & Communications, OBEX Server**, select what you need to build your own environment. The **Completing the New Platform Wizard** window will open to indicate that it has finished creating a new platform. Click **Finish** to complete the setup.


New Platform Wizard - Step 4
Design Template
A design template is a pre-defined selection of Catalog items.
Available design templates:
Custom Device
Digital Media Receiver
Enterprise Terminal
Enterprise Web Pad
Gateway
Industrial Controller
Internet Appliance
IP Phone
Mobile Handheld
Set-Top Box
Tiny Kernel
Windows Thin Client
Choose the design template that is most closely aligned with the purpose of your target device.
Provides the starting point for a range of Web Pad-based devices with touch display and wireless networking.
< Back
Next >
Finish
Cancel


New Platform Wizard - Step 5
Applications & Media
Select items for applications and media to include in your OS design.
Items:
.NET Compact Framework
ActiveSync
DCOM
Lightweight Directory Access Protocol (LD
Standard SDK for Windows CE
VBScript support
Windows Media Audio/MP3
Windows Media Video/MPEG-4 Video
Windows Messenger
WordPad
Internet Browser
Microsoft File Viewers
Windows CE Error Reporting
Support for applications and services designed for the .NET Compact Framework.
Estimated size of these items: 10063 KB
< Back
Next >
Finish
Cancel


New Platform Wizard - Step 6
Networking & Communications
Select items for networking and communications to include in your OS design.
Items:
OBEX Server
TCP/IPv6 Support
Local Area Network (LAN)
Personal Area Network (PAN)
Remote Desktop Connection
Wide Area Network (WAN)
The foundation of the OBEX Application Framework that provides support for both standard and user-defined services.
Estimated size of these items: 10924 KB
< Back
Next >
Finish
Cancel

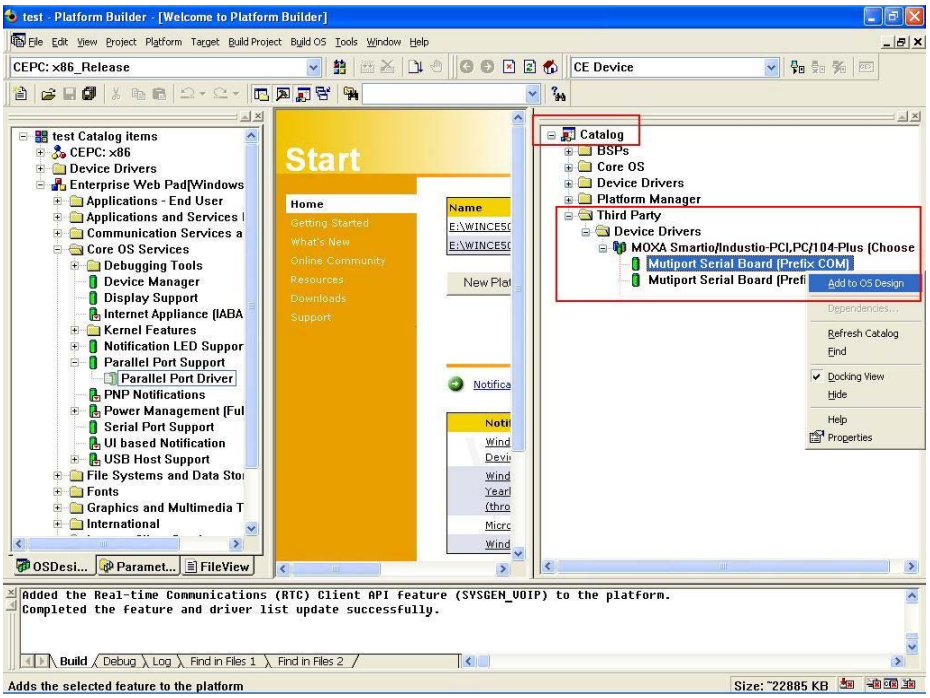

New Platform Wizard - Step 7
OBEX Server
Security Warning
Under certain circumstances, the Object Exchange Protocol (OBEX) catalog item can compromise the security of your platform. This catalog item poses the following potential security risks:
If proper security and authentication techniques are not used, a service that interferes with services.exe can be installed.
If proper encryption techniques are not used, OBEX running over Bluetooth could expose data packets to third parties.
To learn more about potential OBEX security risks, as well as the best practices for using this catalog item more securely, see the following topics:
OBEX Security
Enhancing the Security of a Device
< Back
Next >
Finish
Cancel

New Platform Wizard - Step 8
Completing the New Platform Wizard
You have successfully completed the New Platform Wizard.
You have created an OS design for a Windows CE-based platform. By default, Platform Builder provides a Debug configuration and a Release configuration of this OS design.
Options:
Modify build options for the Debug and Release configurations of your OS design without closing this wizard.
To close this wizard, click Finish.
< Back
Next >
Finish
Cancel

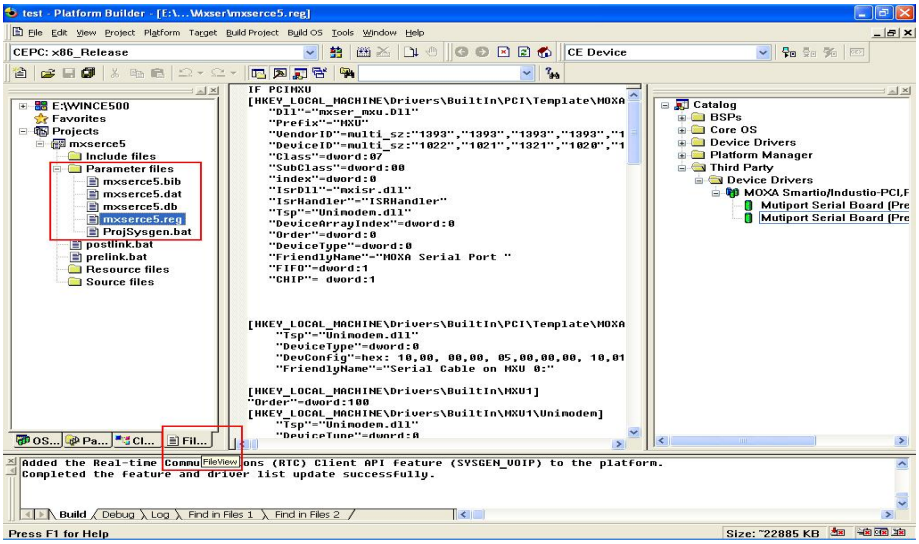
5. Open Manage Catalog Items (**File → Manage Catalog Items**). In the Catalog (**View → Catalog**), browse to **\Third Party\Device Drivers\ Moxa Smartio/Industio-PCI, PC/104-Plus**. Right-click on the driver **Prefix COM** or **Prefix MXU** you would like to include and choose Add to **OS Design**.

   **Note:** You can only select either **Prefix COM** or **Prefix MXU**, but not both.

   Prefix COM supports up to 10 ports, from COM0 to COM9. Prefix MXU supports more than 10 ports, so it is better for you to select Prefix MXU if you are not sure how many ports the device has. Otherwise, you will only be allowed to use one multiport serial board on the target host.



6. After adding Moxa Tech drivers into your **OS Design**, a new project is automatically added to your workspace. The project name is **mxserce5**. The project can be accessed from File View (**View → File View**). The **mxserce5** project contains a number of files used to configure the drivers included in your **OS Design**.




**Note:** If you would like to use "Terminal Emulator" tool, please modify mxserce5.reg and keyboard like below (This is only just for "one" "COM" port). You have to notice number of ports, COM, MXU and enter the correct information.

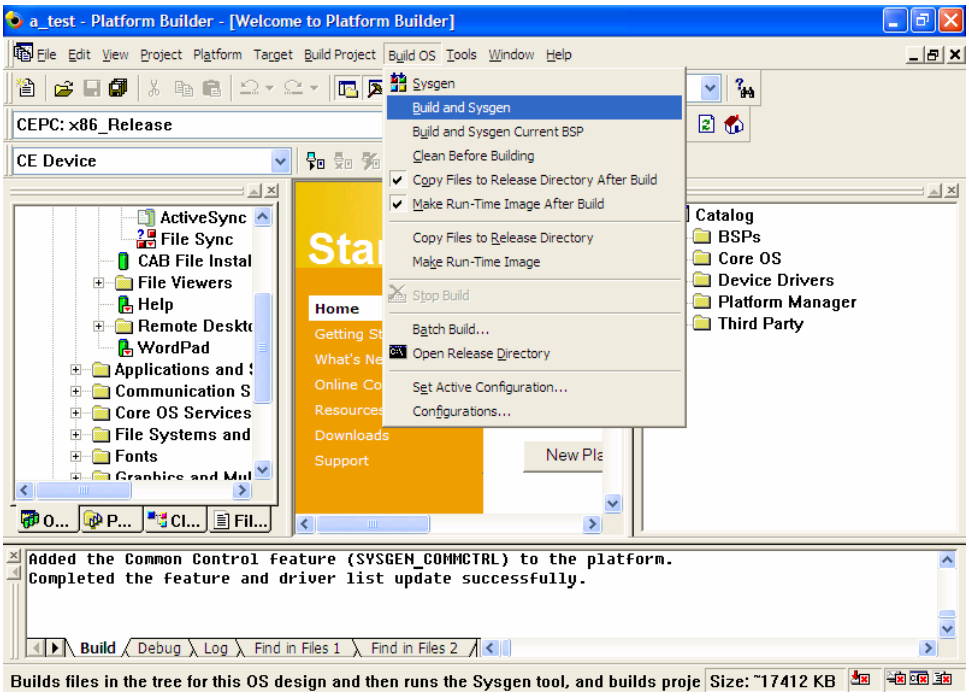
[HKEY_LOCAL_MACHINE\ExtModems\HayesCompat1]

"Port"="COM2:"

"DeviceType"=dword:1

"FriendlyName"="Hayes Compatible on COM2:"

7. Finally, open **Build OS**, select **Build and Sysgen**, and be sure to click **Copy Files to Release Directory After Build** and **Make Run-Time Image After Build**.




8. Finally, copy your image file to the target Host.

   **Note:** If you have created a Windows CE Platform Builder in the development environment, you can skip steps 2, 3, and 4.

# 4

# Serial Programming Tools

Moxa provides an easy to use yet powerful serial programming library, and communication troubleshooting utilities under Windows 2000/XP/2003, Windows 95/98, and Windows NT. The following sections provide details about the installation, the library, and the utilities for various platforms.

This chapter covers the following topics:

- **Moxa PComm**
  - Installing PComm
  - PComm Programming Library
- **Utilities**
  - Diagnostics (for Moxa boards only)
  - Monitor (for Moxa boards under Windows 2000/XP/2003)
  - Terminal Emulator
- **RS-485 Programming**
  - ADDC™

# Moxa PComm

PComm, a professional serial communication tool for PCs, is a software package that runs under Windows NT95/98/2000/XP/2003. PComm provides:

- A powerful serial communication library that simplifies serial programming tasks for most popular programming languages. The serial communication library is useful for developing applications for data communications, remote access, data acquisition, and industrial control under Windows NT95/98/2000/XP/2003, and is a simpler programming solution compared to the more complex Windows Win32 COMM API.
- Useful utilities such as diagnostics, monitor, and terminal emulator.
- Illustrative sample programs.
- Comprehensive on-line documentation.

## Installing PComm

To install PComm, run **\Setup.exe** from the Documentation and Software CD. Note that the PComm diagnostics and monitor utilities are for Moxa boards only. To use these utilities, you must have a Moxa board and the appropriate Windows (NT/95/98/2000/XP/2003) device driver installed in your system. See the "Software Installation" chapter for instructions on how to install the drivers.

After installing PComm, click **Start**, select **Program Files**, and then the **PComm Lite group** to select from the list of utilities and documents.

## PComm Programming Library

The serial communication library helps you develop serial communications programs for any COM port that complies with the Microsoft Win32 API. This library facilitates the implementation of multi-process, multi-thread serial communication programs, and greatly reduces the time required to develop applications.

For a complete description of the library functions and sample programs for Visual C++, Visual Basic, and Delphi, check the help file and the sample programs in the PComm directory.

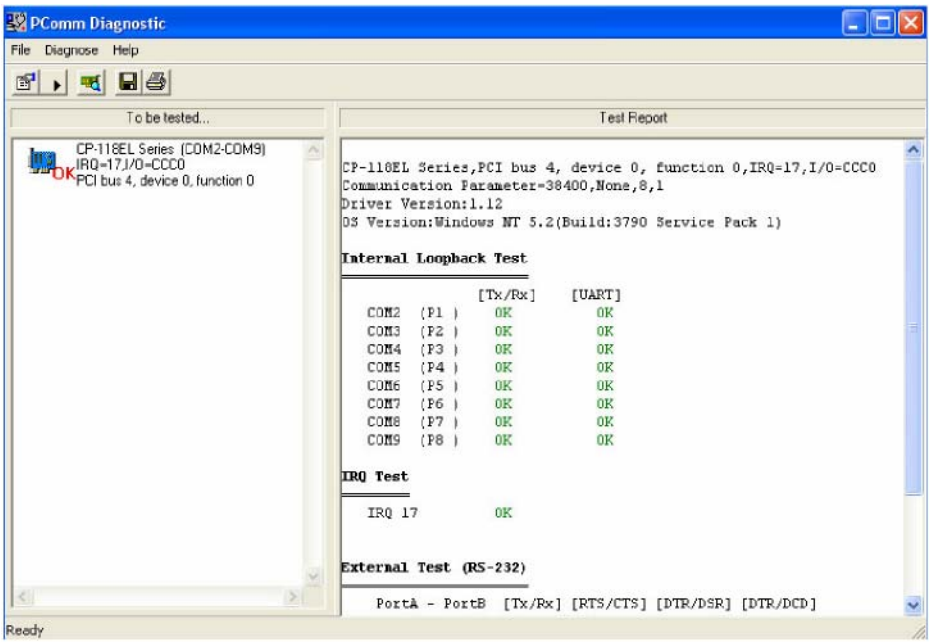
# Utilities

In this section, we provide brief descriptions of each utility. For more information about these utilities, read the on-line help from the Documentation and Software CD.

## Diagnostics (for Moxa boards only)

This convenient diagnostics program, which only works with Moxa boards and ports, provides internal and external testing of IRQ, TxD/RxD, UART, CTS/RTS, DTR/DSR, DTR/DCD, etc. The diagnostics program allows the user to check both the hardware and software functions.

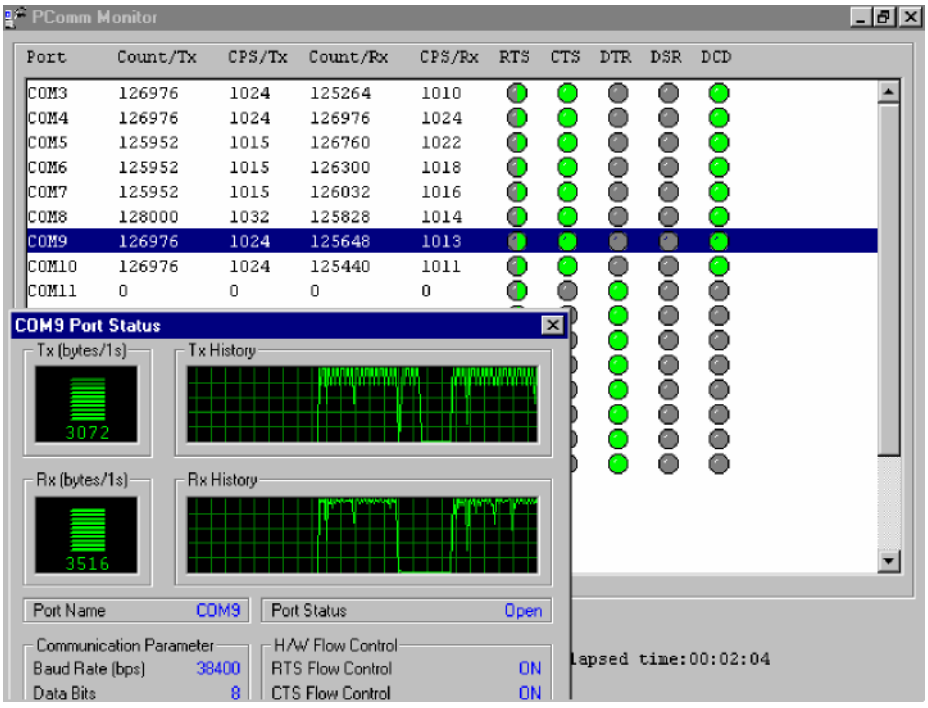
To run the diagnostics program, click **Start → Program → PComm Lite → Diagnostic**. A typical test report for a Moxa board is as follows:




## Monitor (for Moxa boards under Windows 2000/XP/2003)

This useful port status monitoring program allows you to monitor data transmission of selected Moxa COM ports. The program monitors data transmission/receiving throughput, and communication line status, with data updated and displayed on the screen at regular time intervals. Click a specific port to see a graph of the current communication parameters and status of that port.

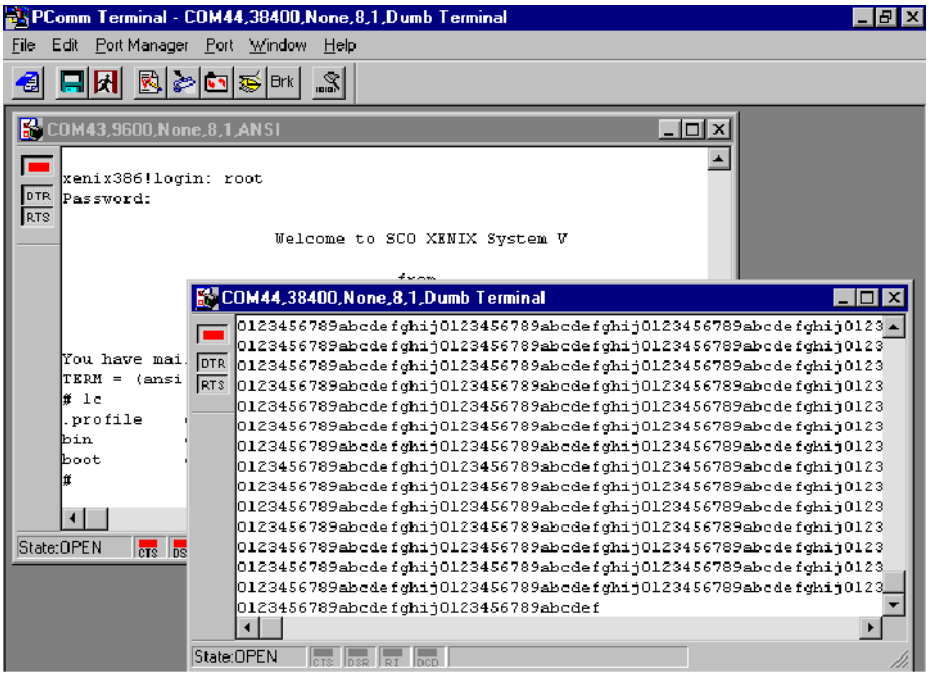
To run the Monitor program, click **Start →Program → PComm Lite → Monitor**.



## Terminal Emulator

Use Terminal Emulator to connect to your PC's serial ports to check if data is being transmitted correctly. Terminal Emulator features multi-windows, and supports VT100 and ANSI terminal types. You can transfer data interactively, send patterns periodically, and transfer files using ASCII, XMODEM, YMODEM, ZMODEM, and KERMIT protocols.

To run Terminal Emulator, click Start → **Program** → **PComm Lite** → **Terminal Emulator**.




# RS-485 Programming

If you are using your CP-118EL Series board for RS-485 applications, in addition to reading this section, you should also refer to the "Connection Cables and Cable Wiring" chapter for more details about using RS-485.

The CP-118EL Series supports 2-wire half-duplex RS-485 and 4-wire full duplex RS-485 communication. Ports configured for 2-wire RS-485 use the Data+ and Data- pins for both transmitting and receiving data. Moxa's own ADDC™ (Automatic Data Direction Control) technology is used to switch between transmission and reception.

## ADDC™

ADDC™ is the best method for switching between transmission and reception when using 2-wire RS-485.

When using ADDC™, additional code is not required to switch between data transmission and reception, since the board's built-in intelligent hardware mechanism automatically manages the switching mechanism. RS-485 programming using ADDC™ mode is just as simple and straightforward as RS-232 or RS-422 programming.

# 5
# Pin Assignments

This chapter covers the following topics:

- **CP-118EL**
  - Board Side Pin Assignments—Female SCSI VHDCI68
  - Device Side Pin Assignments
- **CP-168EL**
  - Board Side Pin Assignments—Female SCSI VHDCI68
  - Device Side Pin Assignments
- **CP-104EL**
  - Board Side Pin Assignments—Female DB44
  - Device Side Pin Assignments
- **CP-102E**
  - Board Side Pin Assignments—Male DB9
- **CP-102EL**
  - Board Side Pin Assignments—Female DB25
  - Device Side Pin Assignments
- **CP-132EL/CP-132EL-I**
  - Board Side Pin Assignments—Female DB25
  - Device Side Pin Assignments
- **CP-114EL/CP-114EL-I**
  - Board Side Pin Assignments—Female DB44
  - Device Side Pin Assignments

To select a PCIe board accessories please refer to the following table:

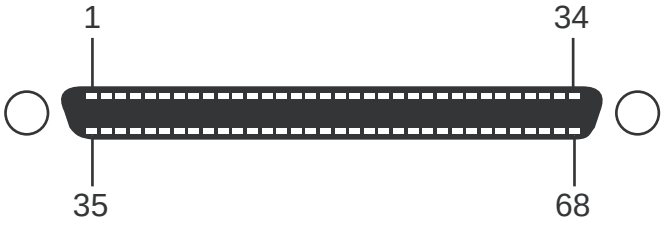
| PCIe Board | Model | Connector Type | Interface |
|---|---|---|---|
| CP-118EL | OPT8D+/OPT8-M9+ | Male DB9 | RS-232<br>RS-422/4-wire RS-485<br>2-wire RS-485 |
| | OPT8B+/OPT8C+ | Male DB25 | |
| | OPT8A+/OPT8S+ | Female DB25 | |
| CP-168EL | OPT8D+/OPT8-M9+ | Male DB9 | RS-232 |
| | OPT8B+/OPT8C+ | Male DB25 | |
| | OPT8A+/OPT8S+ | Female DB25 | |
| | OPT8F+/OPT8Z+ | Female DB25 | RS-422 |
| | OPT8K+/OPT8I+ | Female DB25 | RS-422/RS-485 |
| CP-104EL | CBL-M44M9x4-50 | Male DB9 | RS-232 |
| | CBL-M44M25x4-50 | Male DB25 | |
| CP-102EL | CBL-M25M9x2-50 | Male DB9 | RS-232 |
| CP-132EL/<br>CP-132EL-I | CBL-M25M9x2-50 | Male DB9 | RS-422/4-wire<br>RS-485/2-wire RS-485 |
| CP-114EL/<br>CP-114EL-I | CBL-M44M9x4-50 | Male DB9 | RS-232<br>RS-422/4-wire RS-485<br>2-wire RS-485 |
| | CBL-M44M25x4-50 | Male DB25 | |

# CP-118EL

The CP-118EL board has a female SCSI VHDCI68 connector on the board, with various connection options available for connecting from the board to your serial devices. In this chapter, we provide pin assignments for the board side connector, as well as pin assignments for device side connectors for the different connection options.

The CP-118EL board supports RS-232, RS-422, 4-wire RS-485, and 2-wire RS-485. Note that the RS-422 standard uses a balanced voltage digital interface to allow 9600 bps communication over cables of up to 4000 feet in length. You can connect ten receivers to one driver for broadcasting systems. The RS-485 standard is an enhanced version of the RS-422 balanced line standard. It allows multiple drivers and receivers to work on a multidrop network. A maximum of 32 drivers and 32 receivers can be set up on a multidrop network. The CP-118EL board supports both 2-wire half-duplex and 4-wire full-duplex RS-485 communications. In 2-wire RS-485, Data+/- pins are used for both data transmitting and receiving.

# Board Side Pin Assignments—Female SCSI VHDCI68




## RS-232

| Pin | Signal | Pin | Signal | Pin | Signal | Pin | Signal | Pin | Signal | Pin | Signal |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **1** | RxD6 | **13** | DCD4 | **25** | TxD2 | **37** | RI7 | **49** | RI5 | **61** | TxD1 |
| **2** | CTS6 | **14** | RTS4 | **26** | GND | **38** | RTS7 | **50** | CTS5 | **62** | DSR1 |
| **3** | RI6 | **15** | RI4 | **27** | TxD0 | **39** | DCD7 | **51** | RxD5 | **63** | DTR1 |
| **4** | RTS6 | **16** | CTS4 | **28** | DSR0 | **40** | DTR7 | **52** | RxD3 | **64** | DCD1 |
| **5** | DCD6 | **17** | RxD4 | **29** | DTR0 | **41** | DSR7 | **53** | CTS3 | **65** | RTS1 |
| **6** | DTR6 | **18** | RxD2 | **30** | DCD0 | **42** | TxD7 | **54** | RI3 | **66** | RI1 |
| **7** | DSR6 | **19** | CTS2 | **31** | RTS0 | **43** | GND | **55** | RTS3 | **67** | CTS1 |
| **8** | TxD6 | **20** | RI2 | **32** | RI0 | **44** | TxD5 | **56** | DCD3 | **68** | RxD1 |
| **9** | GND | **21** | RTS2 | **33** | CTS0 | **45** | DSR5 | **57** | DTR3 | | |
| **10** | TxD4 | **22** | DCD2 | **34** | RxD0 | **46** | DTR5 | **58** | DSR3 | | |
| **11** | DSR4 | **23** | DTR2 | **35** | RxD7 | **47** | DCD5 | **59** | TxD3 | | |
| **12** | DTR4 | **24** | DSR2 | **36** | CTS7 | **48** | RTS5 | **60** | GND | | |

### RS-422 and 4-wire RS-485

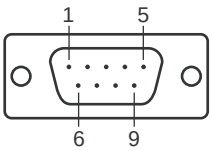
| Pin | Signal | Pin | Signal | Pin | Signal | Pin | Signal |
|---|---|---|---|---|---|---|---|
| **1** | TxD6+(B) | **18** | TxD2+(B) | **35** | TxD7+(B) | **52** | TxD3+(B) |
| **5** | TxD6-(A) | **22** | TxD2-(A) | **39** | TxD7-(A) | **56** | TxD3-(A) |
| **6** | RxD6-(A) | **23** | RxD2-(A) | **40** | RxD7-(A) | **57** | RxD3-(A) |
| **8** | RxD6+(B) | **25** | RxD2+(B) | **42** | RxD7+(B) | **59** | RxD3+(B) |
| **9** | GND | **26** | GND | **43** | GND | **60** | GND |
| **10** | RxD4+(B) | **27** | RxD0+(B) | **44** | RxD5+(B) | **61** | RxD1+(B) |
| **12** | RxD4-(A) | **29** | RxD0-(A) | **46** | RxD5-(A) | **63** | RxD1-(A) |
| **13** | TxD4-(A) | **30** | TxD0-(A) | **47** | TxD5-(A) | **64** | TxD1-(A) |
| **17** | TxD4+(B) | **34** | TxD0+(B) | **51** | TxD5+(B) | **68** | TxD1+(B) |

### 2-wire RS-485

| Pin | Signal | Pin | Signal | Pin | Signal | Pin | Signal |
|---|---|---|---|---|---|---|---|
| **6** | D6-(A) | **23** | D2-(A) | **40** | D7-(A) | **57** | D3-(A) |
| **8** | D6+(B) | **25** | D2+(B) | **42** | D7+(B) | **59** | D3+(B) |
| **9** | GND | **26** | GND | **43** | GND | **60** | GND |
| **10** | D4+(B) | **27** | D0+(B) | **44** | D5+(B) | **61** | D1+(B) |
| **12** | D4-(A) | **29** | D0-(A) | **46** | D5-(A) | **63** | D1-(A) |

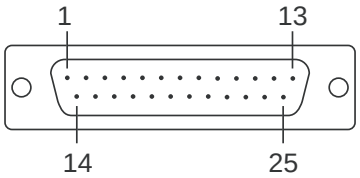
## Device Side Pin Assignments

### Male DB9 (OPT8D+/OPT8-M9+)



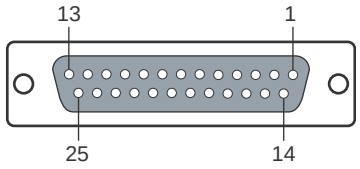

| Pin | RS-232 | RS-422 / 4-wire RS-485 | 2-wire RS-485 |
|---|---|---|---|
| **1** | DCD | TxD-(A) | --- |
| **2** | RxD | TxD+(B) | --- |
| **3** | TxD | RxD+(B) | Data+(B) |
| **4** | DTR | RxD-(A) | Data-(A) |
| **5** | GND | GND | GND |
| **6** | DSR | --- | --- |
| **7** | RTS | --- | --- |
| **8** | CTS | --- | --- |
| **9** | --- | --- | --- |

## Male DB25 (OPT8B+/C+)




| Pin | RS-232 | RS-422 / 4-wire RS-485 | 2-wire RS-485 |
|---|---|---|---|
| **2** | TxD | RxD+(B) | Data+(B) |
| **3** | RxD | TxD+(B) | --- |
| **4** | RTS | --- | --- |
| **5** | CTS | --- | --- |
| **6** | DSR | --- | --- |
| **7** | GND | GND | GND |
| **8** | DCD | TxD-(A) | --- |
| **20** | DTR | RxD-(A) | Data-(A) |

## Female DB25 (OPT8A+/S+)

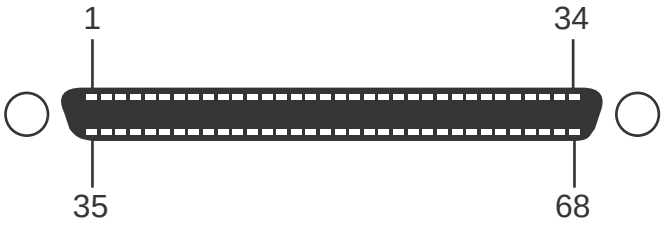



| Pin | RS-232 | RS-422 / 4-wire RS-485 | 2-wire RS-485 |
|---|---|---|---|
| **2** | RxD | TxD+(B) | --- |
| **3** | TxD | RxD+(B) | Data+(B) |
| **4** | CTS | --- | --- |
| **5** | RTS | --- | --- |
| **6** | DTR | RxD-(A) | Data-(A) |
| **7** | GND | GND | GND |
| **8** | DCD | TxD-(A) | --- |
| **20** | DSR | --- | --- |

# CP-168EL

The CP-168EL board has a female SCSI VHDCI68 connector on the board, with various connection options available for connecting from the board to your serial devices. In this chapter, we give pin assignments for the board side connector, as well as pin assignments for device side connectors for the different connection options. The CP-168EL board supports RS-232 interface on board.

## Board Side Pin Assignments—Female SCSI VHDCI68

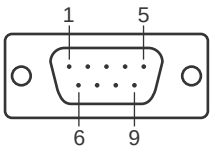



### RS-232

| Pin | Signal | Pin | Signal | Pin | Signal | Pin | Signal | Pin | Signal | Pin | Signal |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **1** | RxD6 | **13** | DCD4 | **25** | TxD2 | **37** | RI7 | **49** | RI5 | **61** | TxD1 |
| **2** | CTS6 | **14** | RTS4 | **26** | GND | **38** | RTS7 | **50** | CTS5 | **62** | DSR1 |
| **3** | RI6 | **15** | RI4 | **27** | TxD0 | **39** | DCD7 | **51** | RxD5 | **63** | DTR1 |
| **4** | RTS6 | **16** | CTS4 | **28** | DSR0 | **40** | DTR7 | **52** | RxD3 | **64** | DCD1 |
| **5** | DCD6 | **17** | RxD4 | **29** | DTR0 | **41** | DSR7 | **53** | CTS3 | **65** | RTS1 |
| **6** | DTR6 | **18** | RxD2 | **30** | DCD0 | **42** | TxD7 | **54** | RI3 | **66** | RI1 |
| **7** | DSR6 | **19** | CTS2 | **31** | RTS0 | **43** | GND | **55** | RTS3 | **67** | CTS1 |
| **8** | TxD6 | **20** | RI2 | **32** | RI0 | **44** | TxD5 | **56** | DCD3 | **68** | RxD1 |
| **9** | GND | **21** | RTS2 | **33** | CTS0 | **45** | DSR5 | **57** | DTR3 | | |
| **10** | TxD4 | **22** | DCD2 | **34** | RxD0 | **46** | DTR5 | **58** | DSR3 | | |
| **11** | DSR4 | **23** | DTR2 | **35** | RxD7 | **47** | DCD5 | **59** | TxD3 | | |
| **12** | DTR4 | **24** | DSR2 | **36** | CTS7 | **48** | RTS5 | **60** | GND | | |

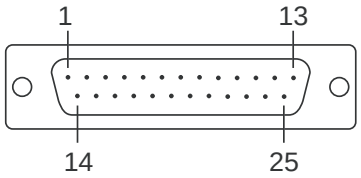
## Device Side Pin Assignments

### Male DB9 (OPT8D+/OPT8-M9+)



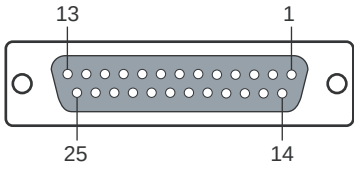

| Pin | RS-232 |
|---|---|
| **1** | DCD |
| **2** | RxD |
| **3** | TxD |
| **4** | DTR |
| **5** | GND |
| **6** | DSR |
| **7** | RTS |
| **8** | CTS |
| **9** | --- |

### Male DB25 (OPT8B+/C+)




| Pin | RS-232 |
|---|---|
| **2** | TxD |
| **3** | RxD |
| **4** | RTS |
| **5** | CTS |
| **6** | DSR |
| **7** | GND |
| **8** | DCD |
| **20** | DTR |

## Female DB25 (OPT8A+/S+)




| Pin | RS-232 |
|---|---|
| 2 | RxD |
| 3 | TxD |
| 4 | CTS |
| 5 | RTS |
| 6 | DTR |
| 7 | GND |
| 8 | DCD |
| 20 | DSR |

## Female DB25 (OPT8F+/Z+)

| Pin | RS-422 |
|---|---|
| 2 | RxD+(B) |
| 3 | TxD+(B) |
| 7 | GND |
| 14 | RxD-(A) |
| 16 | TxD-(A) |

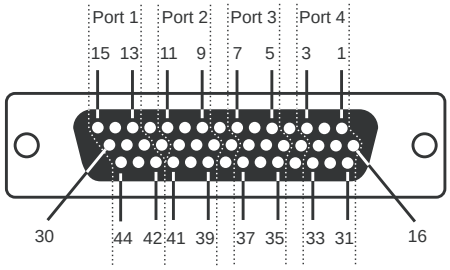
## Female DB25 (OPT8K+/I+)

| Pin | RS-422 / 4-wire RS-485 | 2-wire RS-485 |
|---|---|---|
| 2 | RxD+(B) | Data+(B) |
| 3 | TxD+(B) | --- |
| 7 | GND | GND |
| 14 | RxD-(A) | Data-(A) |
| 16 | TxD-(A) | --- |

# CP-104EL

## Board Side Pin Assignments—Female DB44

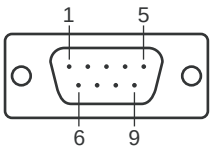
### RS-232




| Port 1 | | Port 2 | | Port 3 | | Port 4 | |
|---|---|---|---|---|---|---|---|
| **13** | TxD | **9** | TxD | **5** | TxD | **1** | TxD |
| **14** | RxD | **10** | RxD | **6** | RxD | **2** | RxD |
| **15** | RTS | **11** | RTS | **7** | RTS | **3** | RTS |
| **28** | CTS | **24** | CTS | **20** | CTS | **16** | CTS |
| **29** | DSR | **25** | DSR | **21** | DSR | **17** | DSR |
| **30** | GND | **26** | GND | **22** | GND | **18** | GND |
| **42** | DCD | **39** | DCD | **35** | DCD | **31** | DCD |
| **44** | DTR | **41** | DTR | **37** | DTR | **33** | DTR |

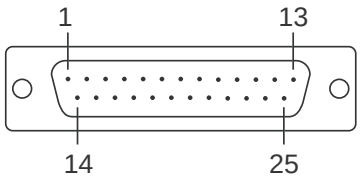
# Device Side Pin Assignments

### Male DB9 (CBL-M44M9x4-50)




| Pin | RS-232 |
|---|---|
| **1** | DCD |
| **2** | RxD |
| **3** | TxD |
| **4** | DTR |
| **5** | GND |
| **6** | DSR |
| **7** | RTS |
| **8** | CTS |
| **9** | --- |

### Male DB25 (CBL-M44M25x4-50)



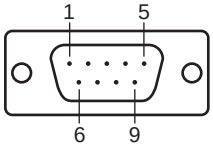

| Pin | RS-232 |
|---|---|
| **2** | TxD |
| **3** | RxD |
| **4** | RTS |
| **5** | CTS |
| **6** | DSR |
| **7** | GND |
| **8** | DCD |
| **20** | DTR |

# CP-102E

## Board Side Pin Assignments—Male DB9

CP-102E has two Male DB9 connectors on board.

### Male DB9

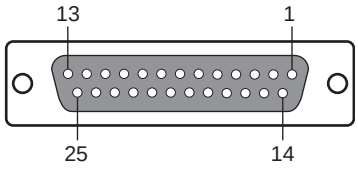



| Pin | RS-232 Signals |
|---|---|
| **1** | DCD |
| **2** | RxD |
| **3** | TxD |
| **4** | DTR |
| **5** | GND |
| **6** | DSR |
| **7** | RTS |
| **8** | CTS |

# CP-102EL

## Board Side Pin Assignments—Female DB25

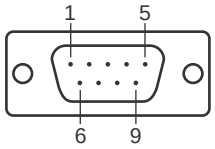
### RS-232




| Pin | RS-232 | Pin | RS-232 |
|---|---|---|---|
| **1** | | **13** | |
| **2** | DCD1 | **14** | |
| **3** | GND | **15** | DTR1 |
| **4** | CTS1 | **16** | DSR1 |
| **5** | RxD1 | **17** | RTS1 |
| **6** | | **18** | TxD1 |
| **7** | | **19** | |
| **8** | | **20** | |
| **9** | DTR0 | **21** | DCD0 |
| **10** | DSR0 | **22** | GND |
| **11** | RTS0 | **23** | CTS0 |
| **12** | TxD0 | **24** | RxD0 |

## Device Side Pin Assignments

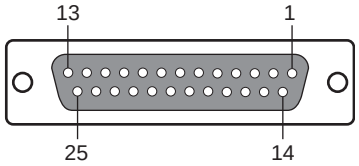
### Male DB9 (CBL-M25M9x2-50)




| Pin | RS-232 |
|---|---|
| **1** | DCD |
| **2** | RxD |
| **3** | TxD |
| **4** | DTR |
| **5** | GND |
| **6** | DSR |
| **7** | RTS |
| **8** | CTS |

# CP-132EL/CP-132EL-I

## Board Side Pin Assignments—Female DB25




**RS-422 & 4-wire RS-485**

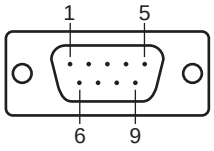
| Pin | Signal | Pin | Signal |
|---|---|---|---|
| **1** | **---** | **14** | **---** |
| **2** | **TxD1-(A)** | **15** | **RxD1-(A)** |
| **3** | **GND1** | **16** | **---** |
| **4** | **---** | **17** | **---** |
| **5** | **TxD1+(B)** | **18** | **RxD1+(B)** |
| **6** | **---** | **19** | **---** |
| **7** | **---** | **20** | **---** |
| **8** | **---** | **21** | **TxD0-(A)** |
| **9** | **RxD0-(A)** | **22** | **GND0** |
| **10** | **---** | **23** | **---** |
| **11** | **---** | **24** | **TxD0+(B)** |
| **12** | **RxD0+(B)** | **25** | **---** |
| **13** | **---** | | |

**2-wire RS-485**

| Pin | Signal | Pin | Signal |
|---|---|---|---|
| **1** | **---** | **14** | **---** |
| **2** | **---** | **15** | **Data1-(A)** |
| **3** | **GND1** | **16** | **---** |
| **4** | **---** | **17** | **---** |
| **5** | **---** | **18** | **Data1+(B)** |
| **6** | **---** | **19** | **---** |
| **7** | **---** | **20** | **---** |
| **8** | **---** | **21** | **---** |
| **9** | **Data0-(A)** | **22** | **GND0** |
| **10** | **---** | **23** | **---** |
| **11** | **---** | **24** | **---** |
| **12** | **Data0+(B)** | **25** | **---** |
| **13** | **---** | | |

## Device Side Pin Assignments

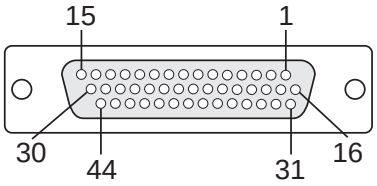
### Male DB9 (CBL-M25M9x2-50)




| Pin | RS-422 / 4-wire RS-485 | 2-wire RS-485 |
|---|---|---|
| **1** | TxD-(A) | --- |
| **2** | TxD+(B) | --- |
| **3** | RxD+(B) | Data+(B) |
| **4** | RxD-(A) | Data-(A) |
| **5** | GND | GND |
| **6** | --- | --- |
| **7** | --- | --- |
| **8** | --- | --- |
| **9** | --- | --- |

# CP-114EL/CP-114EL-I

## Board Side Pin Assignments—Female DB44




### RS-232

| Pin | Signal | Pin | Signal | Pin | Signal | Pin | Signal |
|---|---|---|---|---|---|---|---|
| **1** | TxD1 | **13** | TxD0 | **25** | DTR1 | **37** | GND |
| **2** | RxD2 | **14** | RxD0 | **26** | DSR1 | **38** | --- |
| **3** | RTS3 | **15** | RTS0 | **27** | --- | **39** | DCD1 |
| **4** | --- | **16** | CTS3 | **28** | CTS0 | **40** | --- |
| **5** | TxD2 | **17** | DTR3 | **29** | DTR0 | **41** | GND |
| **6** | RxD2 | **18** | DSR3 | **30** | DSR0 | **42** | DCD0 |
| **7** | RTS2 | **19** | --- | **31** | DCD3 | **43** | --- |
| **8** | --- | **20** | CTS2 | **32** | --- | **44** | GND |
| **9** | TxD1 | **21** | DTR2 | **33** | GND | | |
| **10** | RxD1 | **22** | DSR2 | **34** | --- | | |
| **11** | RTS1 | **23** | --- | **35** | DCD2 | | |
| **12** | --- | **24** | CTS1 | **36** | --- | | |

### RS-422 & 4-wire RS-485

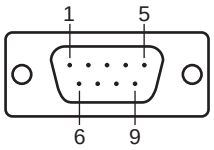
| Pin | Signal | Pin | Signal | Pin | Signal | Pin | Signal |
|---|---|---|---|---|---|---|---|
| **1** | RxD3(+) | **13** | RxD0(+) | **25** | RxD1(-) | **37** | GND |
| **2** | TxD3(+) | **14** | TxD0(+) | **26** | --- | **38** | --- |
| **3** | --- | **15** | --- | **27** | --- | **39** | TxD1(-) |
| **4** | --- | **16** | --- | **28** | --- | **40** | --- |
| **5** | RxD2(+) | **17** | RxD3(-) | **29** | RxD0(-) | **41** | GND |
| **6** | TxD2(+) | **18** | --- | **30** | --- | **42** | TxD0(-) |
| **7** | --- | **19** | --- | **31** | TxD3(-) | **43** | --- |
| **8** | --- | **20** | --- | **32** | --- | **44** | GND |
| **9** | RxD1(+) | **21** | RxD2(-) | **33** | GND | | |
| **10** | TxD1(+) | **22** | --- | **34** | --- | | |
| **11** | --- | **23** | --- | **35** | TxD2(-) | | |
| **12** | --- | **24** | --- | **36** | --- | | |

### 2-wire RS-485

| Pin | Signal | Pin | Signal | Pin | Signal |
|---|---|---|---|---|---|
| **1** | Data3+(B) | **16** | --- | **31** | --- |
| **2** | --- | **17** | Data3-(A) | **32** | --- |
| **3** | --- | **18** | --- | **33** | GND3 |
| **4** | --- | **19** | --- | **34** | --- |
| **5** | Data2+(B) | **20** | --- | **35** | --- |
| **6** | --- | **21** | Data2-(A) | **36** | --- |
| **7** | --- | **22** | --- | **37** | GND2 |
| **8** | --- | **23** | --- | **38** | --- |
| **9** | Data1+(B) | **24** | --- | **39** | --- |
| **10** | --- | **25** | Data1-(A) | **40** | --- |
| **11** | --- | **26** | --- | **41** | GND1 |
| **12** | --- | **27** | --- | **42** | --- |
| **13** | Data0+(B) | **28** | --- | **43** | --- |
| **14** | --- | **29** | Data0-(A) | **44** | GND0 |
| **15** | --- | **30** | --- | | |

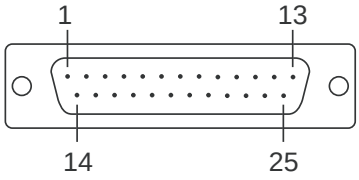
# Device Side Pin Assignments

## Male DB9 (CBL-M44M9x4-50)




| Pin | RS-232 | RS-422 & 4-wire RS-485 | 2-wire RS-485 |
|---|---|---|---|
| **1** | DCD | TxD-(A) | --- |
| **2** | RxD | TxD+(B) | --- |
| **3** | TxD | RxD+(B) | Data+(B) |
| **4** | DTR | RxD-(A) | Data-(A) |
| **5** | GND | GND | GND |
| **6** | DSR | --- | --- |
| **7** | RTS | --- | --- |
| **8** | CTS | --- | --- |

## Male DB25 (CBL-M44M25x4-50)




| Pin | RS-232 | RS-422 & 4-wire RS-485 | 2-wire RS-485 |
|---|---|---|---|
| **2** | TxD | RxD+(B) | Data+(B) |
| **3** | RxD | TxD+(B) | --- |
| **4** | RTS | --- | --- |
| **5** | CTS | --- | --- |
| **6** | DSR | --- | --- |
| **7** | GND | GND | GND |
| **8** | DCD | TxD-(A) | --- |
| **20** | DTR | RxD-(A) | Data-(A) |

# 6

# Troubleshooting

Common PCI Express Series problems and possible solutions are as follows. If you still have problems after reading this chapter, contact your dealer or Moxa for help, or use the Problem Report Form at the end of this manual to report problems to your dealer.

## General Troubleshooting

1. **The Moxa PCI Express board cannot be detected by the Moxa driver while installing the driver.**

   **Hardware causes and solutions:**

   a. The board is not installed in the computer. Please install it.

   b. The board is not properly plugged into the system. If this is the case, re-plug the board into a PCI Express slot. It is also possible that a slot has malfunctioned. In this case, try other slots until you find one that works.

   c. The motherboard does not have an available IRQ for the PCI Express board. In this case, enter the BIOS and make sure there is an available IRQ under PCI/PnP settings.

2. **The Moxa PCI Express board and driver are activated but cannot transfer (transmit/receive) data.**

   **Hardware Causes and Solutions:**

   a. Make sure the cable wiring is connected correctly. Refer to the "Pin Assignments" chapter for correct cable connections.

   b. The cable or the board could be defective. Try other ports, cables, or boards to verify this, or use the PComm Diagnostic utility to test the Moxa board and port conditions. If the Diagnostic program reports an error, replace the faulty components.

   **Software Causes and Solutions:**

   a. PCI Express Series boards will check the line status (CTS) before transmitting data if the RTS/CTS flow control feature is set to Enable in the configuration or application program. Refer to the "Connection Cables and Cable Wiring" chapter for proper wiring diagrams, and check the line status of the suspected port using the diagnostics LED indicators on the mini tester.

   b. The board control application may not be written correctly according to the corresponding API of the operating system. To check this problem, run another application that you know is correct, or use the utilities provided by Moxa (such as PComm Terminal emulator or HyperTerminal under Windows platform).

# A

# Technical Reference

## Product Specifications

### CP-118EL Specifications

| | |
|---|---|
| **Hardware** | |
| Connectors | SCSI VHDCI68 |
| Comm. Controller | MU860 (16C550C compatible) |
| **Interface** | |
| Bus Interface | PCI Express × 1 |
| Number of Ports | 8 |
| Max No. of Boards | 4 (only one IRQ required) |
| **Signals** | |
| RS-232 | TxD, RxD, RTS, CTS, DTR, DSR, DCD, GND |
| RS-422 | TxD+(B), TxD-(A), RxD+(B), RxD-(A), GND |
| 4-wire RS-485 | TxD+(B), TxD-(A), RxD+(B), RxD-(A), GND |
| 2-wire RS-485 | Data+(B), Data-(A), GND |
| **Performance** | |
| Baudrate | 50 bps to 921.6 Kbps |
| **Configuration** | |
| Data Bits | 5, 6, 7, 8 |
| Stop Bits | 1, 1.5, 2 |
| I/O address/IRQ | BIOS assigned |
| Parity | None, Even, Odd, Space, Mark |
| Flow Control | RTS/CTS, XON/XOFF |
| **Power and Environment** | |
| Power Requirement | 860 mA (3.3V) |
| Operating Temperature | 0 to 55°C (32 to 132°F) |
| Operating Humidity | 5 to 95% RH |
| Storage Temperature | -20 to 85°C (-4 to 185°F) |
| **ESD Protection** | Embedded 15 KV ESD Protection |
| **Regulatory Approvals** | EN55022 Class B, EN55024, EN61000-3-2, EN61000-3-3, FCC Part 15 Class B |
| **Warranty** | 5 years |

# CP-168EL Specifications

| | |
|---|---|
| **Hardware** | |
| Connectors | SCSI VHDCI68 |
| Comm. Controller | MU860 (16C550C compatible) |
| **Interface** | |
| Bus Interface | PCI Express × 1 |
| Number of Ports | 8 |
| Max No. of Boards | 4 (only one IRQ required) |
| **Signals** | |
| RS-232 | TxD, RxD, RTS, CTS, DTR, DSR, DCD, GND |
| **Performance** | |
| Baudrate | 50 bps to 921.6 Kbps |
| **Configuration** | |
| Data Bits | 5, 6, 7, 8 |
| Stop Bits | 1, 1.5, 2 |
| I/O address/IRQ | BIOS assigned |
| Parity | None, Even, Odd, Space, Mark |
| Flow Control | RTS/CTS, XON/XOFF |
| **Power and Environment** | |
| Power Requirement | 630 mA (3.3V) |
| Operating Temperature | 0 to 55°C (32 to 132°F) |
| Operating Humidity | 5 to 95% RH |
| Storage Temperature | -20 to 85°C (-4 to 185°F) |
| **ESD Protection** | Embedded 15 KV ESD Protection |
| **Regulatory Approvals** | EN55022 Class B, EN55024, EN61000-3-2, EN61000-3-3, FCC Part 15 Class B |
| **Warranty** | 5 years |

# CP-104EL Specifications

| | |
|---|---|
| **Hardware** | |
| Connectors | Female DB44 |
| Comm. Controller | MU860 (16C550C compatible) |
| **Interface** | |
| Bus Interface | PCI Express × 1 |
| Number of Ports | 4 |
| Max No. of Boards | 4 (only one IRQ required) |
| **Signals** | |
| RS-232 | TxD, RxD, RTS, CTS, DTR, DSR, DCD, GND |
| **Performance** | |
| Baudrate | 50 bps to 921.6 Kbps |

| | |
|---|---|
| **Configuration** | |
| Data Bits | 5, 6, 7, 8 |
| Stop Bits | 1, 1.5, 2 |
| I/O address/IRQ | BIOS assigned |
| Parity | None, Even, Odd, Space, Mark |
| Flow Control | RTS/CTS, XON/XOFF |
| **Power and Environment** | |
| Power Requirement | 430 mA (3.3V) |
| Operating Temperature | 0 to 55°C (32 to 132°F) |
| Operating Humidity | 5 to 95% RH |
| Storage Temperature | -20 to 85°C (-4 to 185°F) |
| **ESD Protection** | Embedded 15 KV ESD Protection |
| **Regulatory Approvals** | EN55022 Class B, EN55024, EN61000-3-2, EN61000-3-3, FCC Part 15 Class B |
| **Warranty** | 5 years |

## CP-102E Specifications

| | |
|---|---|
| **Hardware** | |
| Connectors | Male DB9 x 2 |
| Comm. Controller | 16C550C compatible |
| **Interface** | |
| Bus Interface | PCI Express × 1 |
| Number of Ports | 2 |
| Max No. of Boards | 4 |
| **Signal** | |
| RS-232 | TxD, RxD, RTS, CTS, DTR, DSR, DCD, GND |
| **Performance** | |
| Baudrate | 50 bps to 921.6 Kbps |
| **Configuration** | |
| Data Bits | 5, 6, 7, 8 |
| Stop Bits | 1, 1.5, 2 |
| I/O address/IRQ | BIOS assigned |
| Parity | None, Even, Odd, Space, Mark |
| Flow Control | RTS/CTS, XON/XOFF |
| **Environment** | |
| Operating Temperature | 0 to 55°C (32 to 132°F) |
| Operating Humidity | 5 to 95% RH |
| Storage Temperature | -20 to 85°C (-4 to 185°F) |

| | |
|---|---|
| **ESD Protection** | Embedded 15 KV ESD Protection |
| Regulatory Approvals | EN55022, EN55024, EN61000-3-2, EN61000-3-3, EN61000-6-2, IEC-61000-4-2, IEC 61000-4-3, IEC 61000-4-4, IEC 61000-4-5, IEC 61000-4-6, IEC 61000-4-8, IEC 61000-4-11, FCC Part 15 Class B |
| **Warranty** | 5 years |

## CP-102EL Specifications

| | |
|---|---|
| **Hardware** | |
| Connectors | Female DB25 |
| Comm. Controller | 16C550C compatible |
| **Interface** | |
| Bus Interface | PCI Express × 1 |
| Number of Ports | 2 |
| Max No. of Boards | 4 |
| **Signal** | |
| RS-232 | TxD, RxD, RTS, CTS, DTR, DSR, DCD, GND |
| **Performance** | |
| Baudrate | 50 bps to 921.6 Kbps |
| **Configuration** | |
| Data Bits | 5, 6, 7, 8 |
| Stop Bits | 1, 1.5, 2 |
| I/O address/IRQ | BIOS assigned |
| Parity | None, Even, Odd, Space, Mark |
| Flow Control | RTS/CTS, XON/XOFF |
| **Environment** | |
| Operating Temperature | 0 to 55°C (32 to 132°F) |
| Operating Humidity | 5 to 95% RH |
| Storage Temperature | -20 to 85°C (-4 to 185°F) |
| **ESD Protection** | Embedded 15 KV ESD Protection |
| Regulatory Approvals | EN55022, EN55024, EN61000-3-2, EN61000-3-3, EN61000-6-2, IEC-61000-4-2, IEC 61000-4-3, IEC 61000-4-4, IEC 61000-4-5, IEC 61000-4-6, IEC 61000-4-8, IEC 61000-4-11, FCC Part 15 Class B |
| **Warranty** | 5 years |

# CP-132EL Series Specifications

| | |
|---|---|
| **Hardware** | |
| Connectors | Female DB25 |
| Comm. Controller | 16C550C compatible |
| **Interface** | |
| Bus Interface | PCI Express × 1 |
| Number of Ports | 2 |
| Max No. of Boards | 4 |
| **Signal** | |
| RS-422 | TxD+(B), TxD-(A), RxD+(B), RxD-(A), GND |
| RS-485 4-Wire | TxD+(B), TxD-(A), RxD+(B), RxD-(A), GND |
| RS-485 2-Wire | Data+(B), Data-(A), GND |
| **Performance** | |
| Baudrate | 50 bps to 921.6 Kbps |
| **Configuration** | |
| Data Bits | 5, 6, 7, 8 |
| Stop Bits | 1, 1.5, 2 |
| I/O address/IRQ | BIOS assigned |
| Parity | None, Even, Odd, Space, Mark |
| Flow Control | XON/XOFF |
| **Environment** | |
| Operating Temperature | 0 to 55°C (32 to 132°F) |
| Operating Humidity | 5 to 95% RH |
| Storage Temperature | -20 to 85°C (-4 to 185°F) |
| **ESD Protection** | Embedded 15 KV ESD Protection |
| Optical Isolation | 2 KV (only for CP-132EL-I) |
| Regulatory Approvals | EN55022, EN55024, EN61000-3-2, EN61000-3-3, EN61000-6-2, IEC-61000-4-2, IEC 61000-4-3, IEC 61000-4-4, IEC 61000-4-5, IEC 61000-4-6, IEC 61000-4-8, IEC 61000-4-11, FCC Part 15 Class B |
| **Warranty** | 5 years |

# CP-114EL Series Specifications

| | |
|---|---|
| **Hardware** | |
| Connectors | Female DB44 |
| Comm. Controller | 16C550C compatible |
| **Interface** | |
| Bus Interface | PCI Express × 1 |
| Number of Ports | 4 |
| Max No. of Boards | 4 |
| **Signal** | |
| RS-232 | TxD, RxD, RTS, CTS, DTR, DSR, DCD, GND |
| RS-422 | TxD+(B), TxD-(A), RxD+(B), RxD-(A), GND |
| RS-485 4-Wire | TxD+(B), TxD-(A), RxD+(B), RxD-(A), GND |
| RS-485 2-Wire | Data+(B), Data-(A), GND |
| **Performance** | |
| Baudrate | 50 bps to 921.6 Kbps |
| **Configuration** | |
| Data Bits | 5, 6, 7, 8 |
| Stop Bits | 1, 1.5, 2 |
| I/O address/IRQ | BIOS assigned |
| Parity | None, Even, Odd, Space, Mark |
| Flow Control | RTS/CTS, XON/XOFF |
| **Environment** | |
| Operating Temperature | 0 to 55°C (32 to 132°F) |
| Operating Humidity | 5 to 95% RH |
| Storage Temperature | -20 to 85°C (-4 to 185°F) |
| **ESD Protection** | Embedded 15 KV ESD Protection |
| Optical Isolation | 2 KV (only for CP-114EL-I) |
| Regulatory Approvals | EN55022, EN55024, EN61000-3-2, EN61000-3-3, EN61000-6-2, IEC-61000-4-2, IEC 61000-4-3, IEC 61000-4-4, IEC 61000-4-5, IEC 61000-4-6, IEC 61000-4-8, IEC 61000-4-11, FCC Part 15 Class B |
| **Warranty** | 5 years |